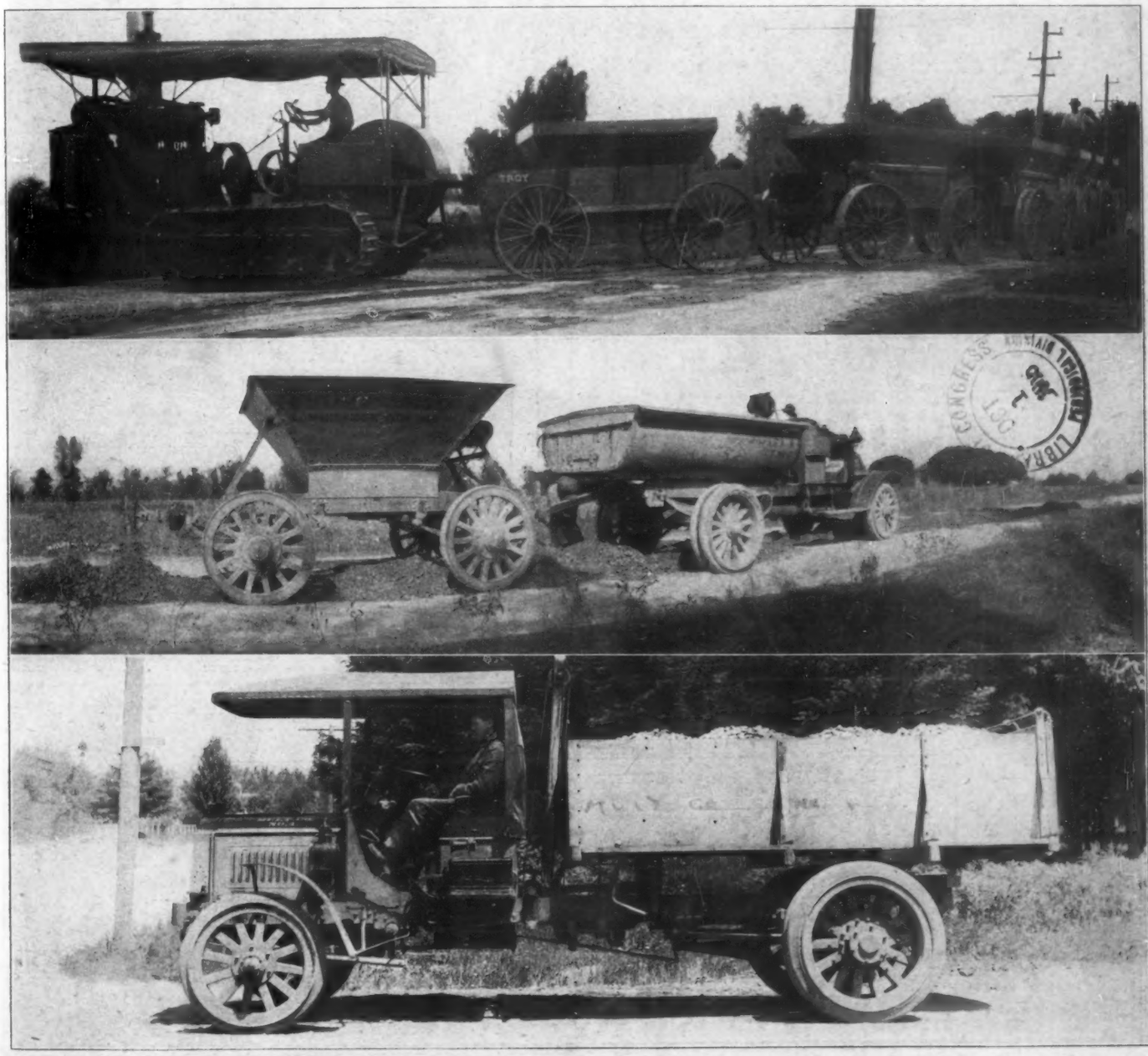
INDEX TO ADVERTISEMENTS PAGE 52

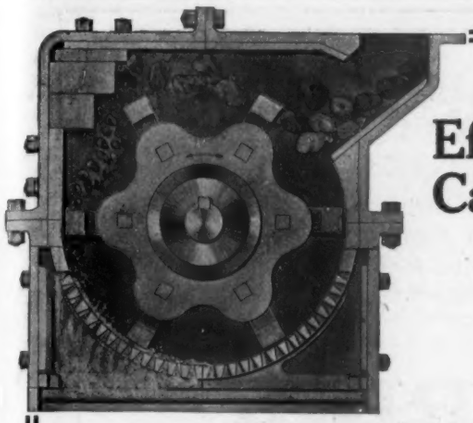
Rock Products and BUILDING MATERIALS

INCORPORATING DEALERS BUILDING MATERIAL RECORD

Volume XVI. CHICAGO, ILL., SEPTEMBER, 22, 1915. Number 10



SOLUTION OF THE TRANSPORTATION PROBLEM IN ROAD CONSTRUCTION. (SEE PAGE 39.)



Efficient Capacity

A No. 1 K-B Pulverizer will reduce three to four tons of limestone per hour to 20 mesh and four to five tons per hour to 10 mesh. A No. 2 K-B Pulverizer will reduce eight to ten tons per hour to 20 mesh, and ten to twelve tons per hour to 10 mesh. The No. 1 machine requires about 15 H. P. and the No. 2 about 30 H. P. to operate.

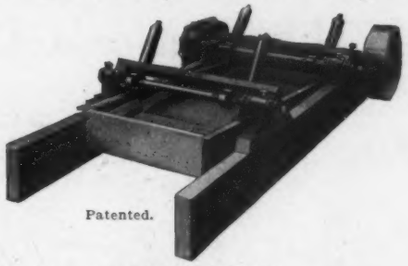
The K-B Pulverizer

Built for Service and Durability

Our engineering department will be pleased to illustrate to you the efficiency of the K-B Pulverizer for your operations. Why not write today?

THE K-B PULVERIZER COMPANY, Inc.
86 Worth Street Manufacturers **New York City**

Symons
Pulsating Screens
For Rock, Gravel, Ore



Patented.

One 24″x7′-0″

With 4 perforated plate sections, 1⅜″ holes, taking 3½″ feed screens out, all 1″ and under and handles 30 tons per hour.

One 36″x5′-3″

With 1″ perforations handled 55 tons per hour
With ¾″ perforations handled 44 tons per hour
With ½″ perforations handled 38 tons per hour

Manufactured and Sold Only by

Chalmers & Williams

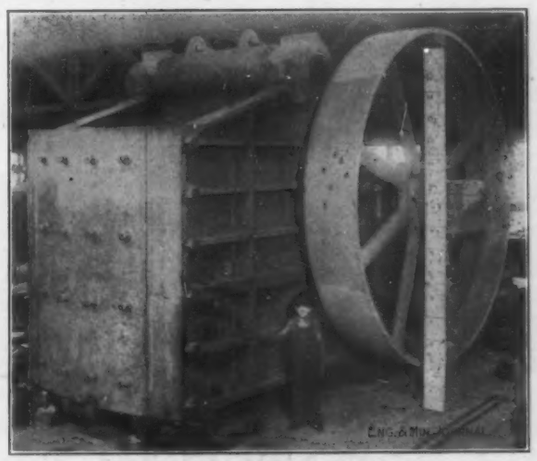
1450 Arnold St. **Chicago Heights, Ill.**
Chicago Office: Edison Bldg. **New York Office: Equitable Bldg.**

TRAYLOR TRIUMPH

Largest
JAW CRUSHER
Ever Constructed

66″ x 86″ Jaw Openings

WATER COOLED BEARINGS, ALL STEEL FRAME



(Over 16′ High and Weighs 500,000 Lbs.)

Tremendous Capacity and Range

JUST completed in the Traylor shops is a jaw crusher which will be used for the destruction of large rocks. This machine will crush all sizes that can be handled by a 6-yd. steam shovel to 8″ at the rate of 500 tons per hour.

It has been demonstrated time and again that the most economical way of destroying anything is by large machines. In recent years this practice has been adopted for crushing rocks and since that time the Traylor Eng. & Mfg. Company have secured orders for 3 of the largest and most up-to-date Jaw Crushers on the market.

These crushers are up-to-date because they are the result of years of experience and careful study of our Engineering Department and embody features that make them the most improved on the market.

All sizes and types are fitted with Water-Cooled Pitman and Bearings; Positive Lubricating System; Large Steel Shafts; Manganese Steel Wearing Plates and massive construction of all parts subjected to severe strains.

Send for Catalogue G-2, describing Jaw Crushers

Traylor Engineering & Mfg. Company
ALLENTOWN, PA.

NEW YORK OFFICE: 24 Church St.
SALT LAKE OFFICE: 510 Newhouse Bldg.

Rock Products and BUILDING MATERIALS

INCORPORATING DEALERS BUILDING MATERIAL RECORD

Volume XVI. **CHICAGO, SEPTEMBER 22, 1915.** **Number 10**

PUBLISHED SEMI-MONTHLY.

DEVOTED TO

Quarry Products, Cement, Lime, Plaster, Sand and Gravel, Clay Products and Building Specialties—Fireproof Building and Road Construction.

THE FRANCIS PUBLISHING COMPANY.

EDGAR H. DEFEBAUGH, Prest.

Seventh Floor, Ellsworth Bldg., 537 So. Dearborn St., Chicago, Ill., U. S. A.
Telephone: Harrison 8086, 8087 and 8088.

EDITORS:

EDGAR H. DEFEBAUGH. FRED K. IRVINE.
GEORGE A. OLSEN, Editor Retailers' Section.
H. F. AKE, Secretary.
DRUSUS H. NICHOLS, Advertising Manager.

Communications on subjects of interest to any branch of the industry are solicited and will be paid for if available.

Every reader is invited to make the office of Rock Products and Building Materials his headquarters while in Chicago.

Editorial and advertising copy should reach this office at least five days preceding publication date.

TERMS OF ANNUAL SUBSCRIPTION.

In the United States and Possessions.....$1.00
In all other Countries in the Postal Union.....$1.50

Subscriptions are payable in advance, and in default of written orders to the contrary, are continued at our option.

Advertising rates furnished on application.

Published on the 7th and 22nd of each month.

Entered as second-class matter July 2nd, 1907, at the Postoffice at Chicago, Illinois, under act of March 3rd, 1879.

The proposition of furnishing European belligerents with money, in billion dollar chunks, or supplying merchandise on credit which amounts to the same thing, don't set very well with the typical American business man. If our foreign friends wanted the money for any other purpose than to fight with, their credit would be more highly considered. Without expending any great amount of energy or working overtime for a minute the financial leaders can find employment for every available dollar that they have to put out right at home with American industries. Our own natural resources are crying for development. Besides the security is physically present and our own people are able and ready and willing to pay a better rate of interest for the money. Everybody believes that all of the belligerents are practically broke or else in financial straights so that any wholesale extension of war credits might precipitate a panic. It is certain that the surplus of deposits in the banks, which alone makes such a course possible, would be promptly withdrawn in such a volume as to seriously embarrass our domestic banking situation. The financial condition of the belligerents now, and after the war is settled and finished, introduces a new status for our commercial relations with the whole world. It is recognized that the commercial and financial attitude of our export trade has got to be entirely changed and rebuilt upon a new foundation as yet barely contemplated and not at all understood. Doubtless this will absorb all of the cash and tax all of the resources that our financiers can command for years to come. Our own government has a big and growing deficit with a certainty of heavy immediate expenditures not yet provided for. While certain narrow interests might be signally benefited were American financiers to adopt the policy of financing foreign belligerents it would be a calamity to the business of the country taken as a whole for them to undertake any such short-sighted proposition. A substantial revolt of the conservative element would be sure to follow, and no one can tell what the end might be.

Unusual weather conditions and tremendous staple crops have delayed the road contractors to a considerable extent. Now the rush is on to move the tonnage of materials that it takes to complete the jobs. The auto truck, the tractor and the trailer constitute the only available medicine for the big job, for teams are short and can never be had again.

The movement of building materials is a little heavier than normal for the season. Building operations generally and heavy improvement work have been delayed by weather conditions to some extent which accounts for present activities. The annual fall rush does not set in until after all the staple crops are harvested, and the crops are later than usual this year, although the largest in history.

There are architects who cannot, or will not, understand the practical advantages of specifying hydrated lime. Usually they are the same individuals who cannot grasp the structural values of concrete or perceive the artistic possibilities of materials that can be molded and modeled to form and contour without limit at no cost. Mossbacks, who prefer the methods of the middle ages would do justice to themselves and the public by getting out of the designing business. Their originality never created a line or an idea and they are in the way of the progress of the age.

It has been a long time since the railroads have done any extending or expanding. They do not expend further attention to the maintenance of present mileage than the physical necessities for keeping casualty expenses within established bounds. The whole intent, purpose and effort of the managements of the railroads is confined to maintaining absolute control of transportation at the highest possible tariffs that the traffic will bear, the systematic stifling of competition of waterways, trolley-lines, motor trucks, or any other possible achievement of invention and the investment of prodigious sums of money in big city terminals. Their collossal expenditures create artificial deficits, which they systematically use for the purpose of raising the tariffs of transportation. There is no argument whatever for a $20,000,000 passenger station anywhere, yet some of them have cost $50,000,000 and some more, and there is a definite policy of filling all the cities with such terminals. Experienced travelers observe that passengers invariably hurry out of the terminals as fast taxi-cabs or street cars can carry them without reference to the terminal surroundings, whether it be merely a comfortable shed of corrugated iron or a granite and marble palace that would make the ghost of Lorenzo de Medici green with envy. No traveler would be willing to pay a penny more for his ticket, if he knew it, simply because the railroad promised to stop their train at their palatial terminal for his edification. The traveler buys a ticket because he desires to transfer his location, and for no other reason. Would it not be possible to give all of the accommodation and convenience that the railroad can contribute to the traveling public at less than five per cent of the cost of recent outlays in this direction? This would certainly help out the deficits that the railroads are continually reporting in their whining complaints of restricted revenues. In maintaining their vast monopoly they doubtless carry a tremendous tonnage of unprofitable freight which could be handled upon the internal waterways profitably. Such a relief would add substantially to their net income. But the ways of American railroads are devious and will probably never be otherwise until the United States Department of Transportation is organized and put to work.

WITH YOU and ME

James T. Duffy, vice-president of the Ohio River Sand Co., Louisville, Ky., has recently become the father of a boy baby.

E. R. Ackerman of the Lawrence Portland Cement Co. of New York has been spending a few days in San Francisco visiting the Exposition.

The weekly luncheons of the Pittsburgh Builders' Exchange, which were discontinued during the summer months, will again be resumed, starting with Sept. 30.

Phil Easterday, operator of concrete pipe works at Portland, Ore., has returned from a business trip through the British Columbia and Puget Sound sections of the Pacific Coast.

William F. O'Connor, well known in building material circles, has organized the Syracuse Builders' Supply Co., at Syracuse, N. Y., of which he is president. H. M. Donovan is secretary.

A. E. Davis, Indiana sales manager for the Western Brick Co., was in Louisville recently, the guest of the R. B. Tyler Co., and during his stay closed several very nice small contracts.

The American Steel & Wire Co. has been awarded the grand prize by the Panama-Pacific International Exposition for the superiority of its products and the high character of its exhibit.

H. T. Morris, the stone dealer in the Empire building, Pittsburgh, has had his share of good contracts this summer and has been shipping a splendid grade of stone from his quarries in Butler county.

Carl Van der Voort, secretary of the Pittsburgh Lumbermen's Mutual Fire Insurance Company, reports that retail lumber and supply dealers in many places are feeling good. Trade has been better with them the past few months and they are beginning to recover from their slow business of last year.

On Labor Day, the Louisville Builders' Exchange held its annual outing at Hikes Point. Tickets sold for one dollar each, and included admittance, refreshments and a chicken dinner. Games of all kinds were provided, as were also various athletic contests. A baseball game proved the feature of the afternoon.

Olin S. Paine has retired from the firm of S. S. Paine & Bro., retailers of lime, cement, brick, drain pipe, etc., at New Bedford, Mass. While the partnership heretofore existing between George W. Paine and Olin S. Paine has been dissolved, the business will be continued under the name of S. S. Paine & Bro., as before, at 8 Union street, that city, with George W. Paine as sole proprietor. George W. Paine represents his firm at the New England dealers' annual meetings and takes an active part in association affairs.

Officials of the Kosmos Portland Cement Co., of Kosmosdale, Ky., are assisting Dr. J. I. Whittenberg, county health office, in his fight against typhoid fever, an epidemic of which was feared in that locality as the result of the discovery of typhoid germs in the water supply of several houses which are owned by the concern. Beginning Aug. 15, the Kosmos Portland Cement Co. shut down its plant for thirty days. The mill is now running at full capacity.

The Louisville Manufacturers' Exhibit, in the Arcadia Building, Louisville, Ky., was opened to the public Tuesday evening, Sept. 7, and a large crowd attended. This exhibit, with its numerous booths engaged by local manufacturers and filled with samples of their products, is to be a permanent fixture of the city and will act as a constant plea for the patronage of home industries. Especially noticeable among the various exhibits were those of the Kosmos Portland Cement Co. and of the Louisville Cement Co. Both firms had attractive displays of their products.

Prof. J. D. Mack, a member of the faculty of the college of engineering of the University of Wisconsin for the past 25 years and one of the best known engineers in the state of Wisconsin, has been appointed by the Wisconsin railroad commission as state engineer at a salary of $6,000. Prof. Mack will have charge of the engineering work of the state railroad, state highway and state tax commissioners, and other boards and associations. Prof. Mack was with the state railroad commission between 1905 and 1912 and it was under his direction that the valuation of the railways operating in Wisconsin was made.

Each day upon the first page of "The Louisville Herald" there appears, in a small boxed-off space, an article under the title of "Things You Should Know About Louisville Industries." Condensed facts concerning the history, nature and volume of business of prominent Louisville concerns (a different one each day) are here stated. Recently, an interesting article upon the Louisville Cement Co. appeared. It told briefly that the company was organized in 1865 by J. B. Speed, and is at present controlled by his son, W. S. Speed. The daily output of the company is estimated at 3,000 barrels of cement. The mills of the company, which were formerly operated at Louisville, are now located at Speed, Ind. The distribution of the company's products covers the entire Middle West, and more than 500 employes are engaged. The weekly payroll of the company is about $12,000. The officers of the company are: W. S. Speed, president; F. M. Sackett, vice-president; Henry S. Gray, secretary and treasurer.

H. L. Lewman, president of the National Association of Builders' Exchanges, has received and accepted an invitation to address the Conference of Builders of America, to be held in San Francisco, Oct. 18 to 28. Among the speakers at the conference will be Col. George W. Goethals, builder of the Panama Canal; Charles Marx, head of the American Society of Building Engineers, and many other prominent men in building and engineering circles. Mr. Lewman's subject will be "The National Association in the Building Industry, and Its Needs." A number of members of the Louisville Builders' Exchange are expected to attend the conference.

To cheapen the cost of insurance to employers of labor in Pennsylvania and other states manufacturers of Philadelphia have formed a casualty insurance cmompany of their own under the name of the Manufacturers' Casualty Insurance Company. The need for a company owned, managed and controlled by employers of labor is especially great because of the workmen's compensation act, which goes into effect on Jan. 1, 1916. In the past year employers in the United States paid to casualty companies more than $31,000,000 in premiums, while the losses paid by the companies amounted to only $9,500,000.

Scheduled Meetings.

Oct. 4-7—Northwestern Road Congress, annual meeting, Cedar Rapids, Ia.

Oct. 11-15—National Paving Brick Manufacturers' Association, annual convention, Dayton, Ohio.

Feb. 12-19, 1916—Ninth Chicago Cement Show, Coliseum and Armory, Chicago, Ill. Cement Products Exhibition Co., Robert F. Hall, 208 South La Salle street, Chicago, secretary.

Feb. 15-18, 1916—Second National Conference on Concrete Road Building, Auditorium hotel, Chicago, Ill. J. P. Beck, 208 South La Salle street, Chicago, secretary.

Feb. 15-16, 1916—Ohio Builders' Supply Association, annual convention, Cleveland, Ohio.

Feb. 16-26, 1916—Complete Building Show, Coliseum, Cleveland, Ohio.

Feb. 17-19, 1916—National Builders' Supply Association, annual convention, Statler Hotel, Cleveland, Ohio.

Indianapolis Calls County Commissioners.

The County Commissioners' Association of Indiana will meet in Indianapolis at the Hotel Severin, Sept. 28-29. Al Zearing, Castle Hall building, Indianapolis, is secretary of the association and upon him is falling the details of the arrangement. The county commissioners, three from each of the 92 counties, highway superintendents, county surveyors, township trustees, 1,016 in number, mayors and other city and county officials not so directly interested, have in some numbers signified their intention to be present. Mr. Zearing expresses his belief that the attendance will be unusually heavy.

Some one representing the postoffice department will present the Federal government idea about good roads. President Kervan and Secretary Zearing have been in communication with Postmaster General Burleson and are "pulling wires" to bring it about. At the Hotel Severin six exhibitors have already booked reservations.

Hon. Jesse Taylor, vice-president and director-general of the National Highway Association, Columbus, O., is down for a talk on "Good Roads." State Geologist Edward T. Barrett of Indianapolis will talk upon "The Natural Resources of Indiana for Road Construction," and George E. Martin, assistant professor of highway engineering, Purdue university, will talk upon his specialty, the subject not yet having been named.

The RETAILER

Pittsburgh Exchange Holds Outing.

Old Sol never shone on a more delightful day than that of Wednesday, Sept. 15, the day on which the Pittsburgh Builders' Exchange held their "Builders' Outing" in the form of a field day, corn roast and dance. On Mr. Craig's kind invitation "Bellwood Farm," near Ingomar station, was selected for the outing and a more glorious time never was had.

The guests began to arrive at two o'clock by electric car and auto, and by three o'clock there were about 250 people on the grounds.

Japanese lanterns were strung in profusion around the lawn and every tree was illuminated by the beautiful mellow lights, while the Craig residence was tastefully decorated with bunting, flags, electric lights and Japanese lanterns.

First on the day's program was the ball game, which was started at three o'clock and was between teams composed of builders and building material dealers.

Manager John Schreiner and Captain John Richmond of the builders, after much deliberation, led a very carefully selected team on the field. Manager George Heppenstall and Captain Warner Olsen of the material dealers, after having practiced with their team every day for two weeks, walked proudly on the field at the tap of the gong with a spirit of conquerors. All agreed that the spirit was there, but the way they played ball indicated that they may have been conquerors in the seventeenth century, but not in the present day, as the score after six innings had been played, stood 15 to eight in favor of the builders.

The tug of war was then arranged and it also resulted in a victory for the builders. Walter Shenk was captain for the victors and C. H. Stolzenbaugh for the vanquished.

While the ball game was being played some of the men indulged in several games of quoits, while many of the ladies who did not attend the ball game contented themselves on the veranda playing "euchre," "500" and "bridge" and eating caramels, peaches and other good things, while other ladies and their male escorts roamed over the 27 acres of the Bellwood farm.

At six o'clock supper was announced and it did not take any coaxing to get every chair at the long table occupied.

All the ladies were seated at the first table and the men gallantly waited for the second table to satisfy their appetites, which after the very strenuous afternoon were very keen. The sumptuous meal consisted of roast corn, roasted potatoes, sliced tomatoes, fried chicken, rolls, ice cream and coffee, and was so well enjoyed that one could hear the smacking of lips almost a mile away.

After supper dancing was indulged in, Mr. Craig having thrown open the beautiful living room of his spacious residence for that purpose, and a good time was had until 11 o'clock, when the party broke up and the last auto pulled out of the grounds.

The day was enjoyed immensely by all who participated and the entertainment committee covered themselves with glory.

Notes on the Outing.

H. H. Gilmore lives on the farm next to Mr. Craig and it was "Gil" who furnished the cider. When he was informed that the crowd would be large, he remained up all of Tuesday night pressing apples. Besides the cider there were 20 gallons of buttermilk and cream (50-50), which was consumed with much gusto. Pounds and pounds of caramels were passed around to the ladies during the afternoon and evening, while the men took pleasure in smoking cigars and "stogies" which were furnished for their enjoyment.

Mr. Craig added to his many generous indulgences by gathering two half bushel baskets full of fine peaches, each one as large as a baseball, and had them passed around to the guests. Mrs. Craig proved herself an ideal hostess and entertained the ladies in a delightful manner. Her kindness in throwing her entire house open to the visitors was greatly appreciated.

"Bill" Goldman certainly made a hit with the ladies, especially when he was passing around the peaches.

George Hogg and Howard Hager proved to be the champion quoit pitchers and have issued a challenge to all comers for the next outing.

President Trimble kept his eye on everybody to see that all had a good time. He was one of the chief rooters for the builders at the ball game.

Every one was delighted with the large number of ladies present, and it goes to show that their presence adds much to the enjoyment of the day.

After the tug of war, "Jim" Golden suddenly took ill with a fainting spell. George Heppenstall, John Richmond and others finally succeeded in helping him to the car of Dr. Harry Kreusler, who cured him at once. Jake Soffel then took "violently" ill and was also cured. "Axe" him.

Willis Dalzell in stealing second base ran about ten feet over the bag and in attempting to get back was touched out. Some one asked him why he didn't slide. "I did," said Willis, "I slid back."

John Schreiner and J. H. Dumbell, the opposing first basemen, both played nice games at first base, as did also "Jake" Soffel and Wallace Reid at third base.

Alex Kahn was assigned to right field and started to go to left. When told he was in the wrong place, he replied, "How am I to know? I never played on these grounds before."

Dave Riffle as official score keeper proved a howling success, at any rate he saw to it that the master builders got credit with 15 runs.

WISCONSIN HAS STATE BUILDING CODE.

Milwaukee, Wis., Sept. 18.—Building material men in all lines all over the state are much interested in the new Wisconsin building code, which has been revised and adopted by the Wisconsin Industrial Commission and published on Aug. 21. The new code became effective on Sept. 20.

The code applies throughout the state, to the smaller cities and villages, as well as to the larger ones. Its administration and enforcement is to be carried out largely through local officials, such as fire chiefs and building inspectors, so that the cost for inspection will be kept at a minimum.

The code covers nearly every imaginable kind of building construction, except private residences, flat buildings used for residence of not more than two families, buildings used for agricultural purposes outside cities and villages, and temporary buildings or sheds used for construction purposes only. It does not limit, however, the power of municipalities to regulate building by more stringent provisions than are laid down in the code. It prescribes rules for the installation of boilers and furnaces, smoke pipes, steam pipes, hot-air pipes, electrical work, lights and roof coverings.

Kansas City Builders Get Together.

The Builders' Association of Kansas City has been organized, succeeding to the property and funds of the Master Builders' Exchange of Kansas City, and taking up its work. A new charter has been issued to the Builders' Association and the association is now moving the furnishings and papers of the Master Builders' Exchange to new quarters on the second floor of the Midland building. The secretary of the new organization is J. A. G. Badorf, since 1913 manager of the Kansas City branch of the Erectors' Association and secretary of the General Contractors' Association of Kansas City. The plan of the new association is to bring together all the factors of the building trades, the organization consisting of a board of governors composed of two regularly elected representatives from each regularly organized affiliated branch of the industry. This board will do work, and direct the activities of the affiliated associations along the following lines, as mentioned in article two of the constitution:

The objects of this association shall be to promote and protect the interests of its members; to maintain just and equitable treatment of their relations with each other and with their employes; to promote steadiness of employment in the building trades; to promote and facilitate the settlement of labor disputes; to prevent strikes; to encourage the formation of associations of contractors, and to promote and protect the business interests of its members and its affiliated associations. Also to provide proper means of furthering the educational, social and fraternal interests of its members and of the building trades generally; and to protect and enhance the industrial and commercial interests of Kansas City and vicinity.

The field of the Master Builders' Exchange of Kansas City has been largely confined to the city; its activities were largely to get the builders together informally. The new association will cover four counties, Jackson and Clay in Missouri, Wyandotte and Johnson in Kansas. The business organization will, as mentioned, consist of a board of governors composed of two representatives from each association—thus stimulating the formation of organizations in the building trades. So far ten associations have formally allied themselves, brick contractors, cut stone men, electrical contractors, plasterers, painters, material dealers, general contractors, stone masons, iron and steel men and millmen. Other associations are now being formed that they may attain formal representation on the board of governors. Members of the affiliated organizations become "represented members" by the payment of the annual fee, $12. The same fee is paid by individuals not members of organizations who, however, do not have voice in the board of governors. Both classes of membership pay also one-tenth of one per cent of all contracts to the association. Both classes of membership give bonds, the represented members giving bond for $500 each, the individual member $1,000. These bonds guarantee compliance with the rules of the association. There will also be associate membership, men not selling material or service to the public, agents for manufacturers, etc.

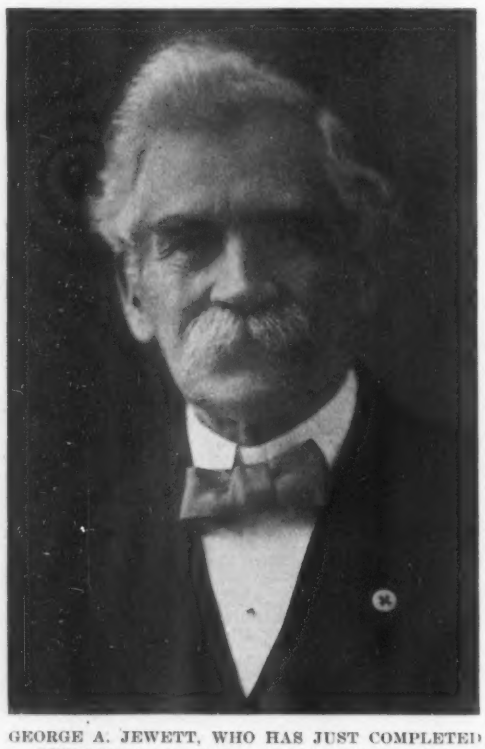
It is the aim of the association to encourage the various affiliated organizations to establish headquarters for active work, and these headquarters probably will be grouped about the central office in the Midland building. Three of the affiliated organizations already have arranged for offices there. The officers of the new association are: Jas. E. Taylor, contractor, president; J. Q. Smithers, painter, vice-president; E. L. Winn, contractor, second vice-president; E. L. Marty, manager Armourdale Foundry Co., treasurer; J. A. G. Badorf, secretary.

Jewett Celebrates Fiftieth Anniversary.

George A. Jewett, president of the Jewett Lumber Co., Des Moines, Ia., celebrated the fiftieth anniversary of his entry into Des Moines on Aug. 18. On that day Mr. Jewett said:

Fifty years ago today, August 18, 1865, I walked into Des Moines, coming from down in Marion county, where I was born and raised.' I walked because I did not have the price of a ride on Colonel Hooker's stage, as they charged ten cents a mile.

The railroads at that time were not running into Des Moines. The Des Moines Valley, now the Keokuk and Des Moines branch of the Rock Island, was running as far as Pella. The Rock Island road was at Grinnell, while the Northwestern had its terminus at Nevada, the first train coming into Des Moines some two years later on the Des



GEORGE A. JEWETT, WHO HAS JUST COMPLETED FIFTY YEARS OF ENDEAVOR AT DES MOINES, IOWA.

Moines Valley road. On this occasion nearly half of Des Moines were out to see the first train come in.

The Des Moines Register and Leader, appreciating the fact that Mr. Jewett had made a success in life and had developed an important business in the city of Des Moines, requested him to prepare an article recalling his experiences of half a century ago, which he did in a most interesting manner, proving his memory to be an exceptional one, as with little effort he recalled all of the principal points of interest and prominent persons of that time.

The day was celebrated by giving the employes of the company and their families a picnic, on which occasion 83 persons sat down to dinner. Mr. Jewett stated that to him it was a pleasant sight. "It was like one big family getting together," he said. "You see our employes are as much interested in helping our customers as I am. In my talk I spoke of giving good service to our customers. Everybody, from the office man who estimates the bill and takes the order and the yardmen who pick it out and load it, to the teamster who delivers it, can be relied upon."

Another thing emphasized by Mr. Jewett is the fact that he is a thorough believer in "honesty in advertising." As he has built up his business through a great deal of advertising, he is fully acquainted with the subject and knows the merits of the honesty policy.

July 28 was another great day for Mr. Jewett. It was the occasion of the reunion of the Jewett family, of which he is president. This was held at the San Francisco Exposition. The fair management took occasion to honor the reunion by naming the day, "the Jewett Family of America Day."

Upon his return to Des Moines from the fair, Mr. Jewett used the knowledge he had gained of bungalow construction in the West in his advertising matter. In each of the Des Moines newspapers appeared pictures very much similar to the buildings he had seen and describing their construction.

Brevities of the Retail Field.

The Houston Brothers Co., Pittsburgh, Pa., have had a fair season in their brick sales, although trade has not been as good as they anticipated in the spring. Prices have been cut hard all along the line.

James M. Porter, a large paving brick distributor of the Pittsburgh district, has secured some very good contracts this summer. He complains like other paving brick men of much hackneying in prices and also of slow collections.

Donora, Pa., is one of the towns in the Pittsburgh district where builders' supply men are likely to make a lot of money this fall and winter. Work has been started there on a $5,000,000 smelter plant which the United States Steel Corporation is building. This project, together with the mills at Donora, are now employing more than 2,150 men and the last payroll there was $167,000 for two weeks, the largest in the history of the town.

One of the Pennsylvania districts which will probably show up a large amount of fall and winter building is the Mahoning and Shenango valleys, where all steel mills are working now to capacity and immense new steel plants and additions are being built.

The Bruckman Lumber Co., a leading retail concern of Northern Pittsburgh, reports business spotted but conditions in general a little more favorable than a few weeks ago.

The Diamond Lumber Co., a thrifty retail concern at Ironton, Ohio, has secured the contract for rebuilding the Syndicate building in that city.

The Retail Lumber Dealers' Association of Pennsylvania will resume the monthly meetings of its directors now that hot weather is coming to an end and will begin to make preparations soon for the big annual convention to be held in Pittsburgh in February. A considerable increase in membership is anticipated before that time.

At Warren, Ohio, there is more house building being done than at any other time in the town's history and other towns in the Mahoning valley, including Youngstown, especially, are also making big records in house building.

E. B. Ogden, who for 12 years has been manager of Armour & Co.'s plant at Chattanooga, Tenn., now heads a new organization known as the Ogden-Brock Co., which succeeds the Barnes Coal and Supply Co. W. E. Brock, who retires in favor of Mr. Ogden, retains his financial interest in the company and will give it his personal attention. Upon Mr. Ogden's resigning from Armour & Co., he was presented with a silver loving cup by his associates in the Armour house at Chattanooga. The officers of the new Ogden-Brock Co. are E. B. Ogden, president; E. Scott Miles, vice-president; and M. L. Brock, secretary and treasurer. Vice-president Miles has been in the building material business for 20 years, and has made an unusually successful record as manager of the Southern White Lime Co. at Spring City.

CHICAGO FIRM MAKING IMPROVEMENTS.

The Wilcox Co., retailers of sand and gravel and other materials, have recently constructed a new stable of large dimensions at their main yard, 3690 Milwaukee avenue, Chicago. An addition has also been made to their sand and gravel hopper.

With the rapid strides made by the Wilcox Co., in this particular field, the time will soon arrive when it will be classified among the largest, if not the largest, building material yard in the city of Chicago.

Meyer Employees Enjoy Smoker.

A smoker and building material motion picture display in the interests of the Meyer Educational Organization of A. B. Meyer & Co., was held at the Chamber of Commerce, Indianapolis, Ind., on Monday, Sept. 13.

A regular program had been prepared, with A. B. Meyer, president of the company, as the first speaker. Mr. Meyer confined his remarks to general instructions on salesmanship and service.

After roll call by the secretary, R. M. Beckler presented motion pictures and gave an explanatory talk on the manufacture and uses of gypsum prod-

DAYLIGHT AND NIGHT SCENES AT OFFICE OF A. B. MEYER & CO., INDIANAPOLIS, IND.

ucts. The pictures were shown through the courtesy of the United States Gypsum Co. and were presented for the first time in Indianapolis.

"Building Material Specialties" was the subject of an interesting discussion by J. G. Warren of the company's building material department.

After a brief period during which refreshments were enjoyed, F. N. Dunbar, through the courtesy of the Coal Bell Coal Co., presented motion pictures of the operation and properties of the company's mine located at Bentree, W. Va.

The Meyer Educational Organization was formed, as A. B. Meyer explained, "for the purpose of making the men better for the company and placing them in a better position to give service to customers." It is divided into two sections, namely, building materials and coal. The members of these sections meet on alternate Monday nights and occasionally the officers arrange a joint meeting so as to bring the heads of departments together and foster acquaintanceship. A. B. Meyer is chief guide of the organization, while C. F. Meyer, Sr., is assistant guide, with J. G. Warren, instructor of the first division; H. C. Speigel, instructor of the second division; C. L. Pierce, treasurer, and E. L. Alford, secretary.

The building occupied by A. B. Meyer & Co. has an attractive appearance at night as well as by day. Electricity is used lavishly and with striking effect. In order to impress upon the sales and office forces the fact that the company is "always on the job," two photographs showing day and night scenes have been made. These illustrations adorned the cover of the printed "Smoker" program and reproduced herewith.

BUILDERS' SPECIALTIES

Metal Lath as a Stock Proposition.

The keen building material dealer is constantly on the watch for every opportunity to increase the volume of his business. The greater part of that volume is, of course, due to the sales of staple building materials such as lime, cement, etc. But these are not the only materials necessary for the erection of a building. There are many smaller products that are often classed as specialties. Other things being equal, the contractor prefers to place his order with one dealer. Hence the volume of business goes to the supply dealer who can furnish the greatest number of the materials required, including both specialties and staples.

Among those products that are classed as specialties may be included metal lath. Although metal lath has been manufactured for over 25 years, it is comparatively a short time since it became an important factor in building materials. The increased demand for metal lath has been due in a considerable extent to the demand by owners for buildings that are fire resisting. A greater factor in increasing the use of this material is the improved manufacturing methods that have been adopted within the past few years by the leading manufacturers.

Metal lath is a fabric consisting of various sized meshes manufactured from sheet steel. The best type is said to be the one having a small mesh shaped somewhat like a diamond. Various gauges of steel are used, thus producing different weights of lath. The general tendency on the part of experienced designers is to specify the heavier weights of metal lath as these give the more satisfactory results.

To secure a stock of metal lath that will sell the quickest, it is necessary to determine just what the material will be most generally used for. For instance, the stock suitable for the larger cities will not be so practicable for the smaller towns. A little investigation among architects and builders will determine the uses for metal lath in your locality.

For stucco work only the heavier weights of lath should be used. If the principal demand for metal lath is for this class of work, the dealer should stock nothing lighter than a 24-gauge metal lath. This should be painted or galvanized. The greatest demand will be for the painted lath. All of the leading manufacturers now supply their lath painted with a high grade coating that fully protects the material.

Many cities now have a clause in their building ordinance requiring the use of metal lath and cement plaster over heating plants in residences and apartments. For this class of work either 24 or 25-gauge lath may be used. If the joists are furred with strips on 12-inch centers, 26-gauge lath may be used.

For all ceiling work nothing lighter than 24-gauge lath should be used. This applies both to suspended ceilings and to work where the lath is applied directly to the joists.

For lathing on interior walls and partitions 26-gauge should be used where the lath is applied directly to wood studding. For solid partitions 27-gauge is often used, but more satisfactory results will be obtained if the 26-gauge is used.

For ornamental plastering work either 26 or 27-gauge lath is suitable. Probably the greater amount of this class of plastering is applied over 27-gauge lath.

A NEW WALL TIE.

Among the newer things brought out by manufacturers of building specialties, which dealers find quite profitable, is a new wall tie manufactured by

NEW "G-F" WALL TIE.

The General Fireproofing Co. of Youngstown, Ohio.

The new "G-F" wall tie has many distinct advantages which the brick builder as well as the builders' supply dealer will appreciate. It is made with extra deep corrugations so it will give maximum bonding surface. And it will serve the purpose of either a brick bond or a veneering tie. Note by illustration it is punched with two holes at either end.

The "G-F" wall tie simplifies the dealers' stock in that he needs carry but one style tie and the brick builder appreciates that same advantage—one tie is all he requires and he doesn't have the trouble of keeping both bond and veneering ties on hand.

Shop practices have been standardized to such an extent by the company that it can produce these ties at the minimum cost, which means, of course, that the trade will be benefited in like manner.

The ties are packed in secure wooden boxes of 1,000 each and are always furnished galvanized.

The use of wall ties is becoming quite general. The present-day brick builder knows he can build walls easier, cheaper and quicker by using wall ties than by the old-time method of using headers. This, coupled with the increasing amount of brick work being done, means a big demand for wall ties, which the dealer should sense and be prepared for.

EMIL RIESE RESIDENCE, LOS ANGELES, ON WHICH "GUNITE" WAS THROWN UPON EXPANDED METAL LATH FOR STUCCO FINISH.

NEW INCORPORATIONS AND VENTURES.

The Southern G-F Co., Atlanta, Ga.; capital, $5,000; to deal in building materials; incorporators, J. H. Deering and L. Aranstan, Atlanta, and A. W. Clarkston, Richland county, S. C. This company will be Southeastern selling agents for the General Fireproofing Co., Youngstown, Ohio.

Atlanta Builders & Supply Co., Atlanta, Ga.; capital, $5,000; incorporators, Hamilton Douglas, Jr., and Harry W. Belfour.

Prescott-Cutler Co., Spencer, Mass.; capital, $40,000; general hardware, building materials, plumbing, heating and jobbing; directors, Edward P. Cutler, president; Harry R. Prescott, treasurer, and E. F. Seward.

Syracuse Builders' Supply Co., Syracuse, N. Y.; capital, $10,000; to manufacture plaster and cement products and deal generally in building materials; incorporators, William F. O'Connor, Emma F. O'Connor, Hubert M. Donovan and others.

Swift Bros., Inc., Millbrook, N. Y.; capital, $50,000; to deal in lumber and building materials; incorporators, H. H. Swift and others.

Earl B. Sittey Co., Camden, N. J.; capital, $15,000; to deal in feed and building materials.

Hochberg Contracting Co., Inc., Manhattan, New York; capital, $2,000; to manufacture brick, stone, building materials, etc.; directors, Morris, Lena and David Hochberg, 423 Cherry street, New York City.

Russell Fireproofing Co., Russell, Ont.; capital, $50,000; incorporators, A. Walker, A. Kenney and J. A. Cochrane.

The Edward Tomajko Lumber Co., Langeioth, Washington county, Pa.; capital, $25,000; retail building materials; incorporators, Edward Tomajko, Adamsburg; Carl D. Smith, Swissvale; Gilbert F. Zehner, Wilkinsburg.

SALES BUREAU FORMED AT THE HAGUE.

Under the cumbersome name of "Verkoopbureauvoor Nederland van Buiten Syndicaat Portlandcementfabrieken," a sales bureau has been organized at The Hague, for the purpose of disposing of Portland cement, lime and other building materials. The organization is somewhat similar to but does not include members of the "Syndicate of Building Material Manufacturers of Holland." Theodore de Groen has been elected president of the bureau and C. Hehenkamp has been selected as general manager.

PURCHASES SUPPLY CONCERN.

The People's Coal Co., Williamsville, N. Y., announces that that firm has been dissolved by mutual agreement, and that it has transferred the business and assets of the company to the Amherst Builders' Supply & Coal Corporation, a domestic corporation, which has assumed all the obligations of the People's company and will carry on the business at the same location. The officers of the new concern are as follows: H. B. Long, president; J. P. Fischer, vice-president and secretary, and Michael Fischer, treasurer.

N.B.S.A.

Indiana Retailers Continue to Organize

Anderson, Muncie, and Logansport Are Scenes of District Meetings During Past Week—Lafayette District Soon to Follow.

Last week added three more district associations to the Indiana division of the National Builders' Supply Association. In the cities of Anderson, Muncie and Logansport members of the various committees assembled for the purpose of permanently affiliating themselves as individual members as well as sectional parts of the national retailers' association. A number of dealers assembled in the city of Lafayette, but decided to postpone action tending toward organization until a later date.

The first of these meetings was held at the New Grand hotel, Anderson, Ind., Thursday noon, Sept. 16, at which time ten building material men sat down to luncheon and discussed common problems and their solution. R. W. Bailey, who is chairman of District No. 7, comprising Anderson and a number of surrounding cities and towns, presided at the meeting. After explaining the objects of the National Builders' Supply Association, he called upon G. A. Olson, of ROCK PRODUCTS AND BUILDING MATERIALS, who is also field secretary of the National Builders' Supply Association, to explain the district association movement and recite the experiences of retailers who have endorsed this new feature of the National Association.

O. H. D. Rohwer, of the Lehigh Portland Cement Co., was then asked to give the manufacturers' views of the retail situation. He explained that any movement that had for its ultimate object the elevation of the building material dealer met with the hearty approval of the manufacturers. They realize, possibly more than the dealers suspect, that the prosperity of the dealer is always reflected in the financial condition of manufacturers.

Then followed a session of personal experiences in which the various retailers assembled told of the peculiar positions they are often placed in and of their desire to improve present methods and thereby increase profits. In this connection W. L. McCampbell, of the Murphy & Kuntz Lumber Co., of Middletown, Ind., said: "Organization is one of the best features that could be inculcated among dealers in any line." He stated that he was a member of the state lumber association and that he full well realized he was getting direct as well as indirect benefits from that organization. "We do not need to talk prices in our meetings," said Mr. McCampbell, "but there are a lot of things we can discuss in common. Five years ago I did not know a 'two-by-four' from a tenpenny nail, but by applying myself to the business which I took up at that time and by associating myself with men in the same line of business, I soon became acquainted with lumber terms. What can be accomplished in the lumber industry can also be secured from gatherings of builders' supply dealers."

R. W. Bailey, or "Bob," as he is called in Anderson, stated that for two years or more he, together with S. B. Harlan, of the Concrete-Fuel Co., of Anderson, had been seriously investigating a remedy for the problems of the building material dealer, and that until the proposition of the National Builders' Supply Association was presented he had found nothing which appealed to him as being worth while. Although young in business, he said that he wanted to stay and incidentally make some money while in it. He recalled that at the various state meetings the "big" fellows were out in numbers. "If it is a good thing for them, it ought to be good for dealers in the smaller cities and towns, in which class we find ourselves," he said.

Before adjourning the meeting it was decided to hold another gathering at the same hotel on Thursday evening, Sept. 23.

Attendance.

Among those present at the Anderson meeting were the following:

S. B. Harlan, Concrete-Fuel Co., Anderson, Ind.
J. W. Bailey, J. W. Bailey Co., Anderson, Ind.
R. W. Bailey, J. W. Bailey Co., Anderson, Ind.
W. H. Crosley, Pendleton Fuel & Feed Co., Pendleton, Ind.
T. W. Mullen, T. W. Mullen Coal Co., Alexandria, Ind.
W. L. McCampbell, Murphy & Kuntz Lumber Co., Middletown, Ind.
O. T. D. Rohwer, Lehigh Portland Cement Co., Chicago, Ill.
M. Price, Lehigh Portland Cement Co., Chicago, Ill.
J. C. Leaker, Castalia Portland Cement Co., Pittsburgh, Pa.
C. I. Thompson, Robinson-Clay Products Co., Akron, Ohio.
G. A. Olsen, ROCK PRODUCTS AND BUILDING MATERIALS, Chicago, Ill.

The Meeting at Muncie.

Thursday evening, Sept. 16, retailers of Muncie, Ind., assembled themselves at the Hotel Delaware, where they enjoyed a little supper, followed by a meeting in one of the parlors of the hotel. Here, as at Anderson, the dealers realized that they were daily confronting problems and conditions which were robbing them of a just and reasonable profit and which had a tendency to keep the competitive dealers at loggerheads with each other.

C. A. Hamilton is chairman of District Number Eight, and as such took charge of the meeting. At his request G. A. Olsen, as at Anderson, explained the objects of the National Builders' Supply Association in forming district committees in various parts of Indiana. Because of the fierce competitive conditions existing in this district and the subsequent loss because of loose credits, he dwelt on the credit plan of the N. B. S. A., and how it can assist any number of dealers, regardless of where they transact their business. This appealed to the retailers present and constituted the principal subject up for discussion.

It was decided to hold another meeting in the near future, the date and place of which will be set by the national association.

Attendance at Muncie Supper.

Among the men present at the Muncie supper were the following:

William A. Thornburg, Holderfield Supply Co., Muncie, Ind.
Henry F. Bunner, Holderfield Supply Co., Muncie, Ind.
J. Gus. Guthrie, Muncie Builders' Supply Co., Muncie, Ind.
L. E. Vardaman, Muncie Builders' Supply Co., Muncie, Ind.
Fred Illingworth, Holderfield Supply Co., Muncie, Ind.
Arthur G. Dague, Dague's Builders' Supply Yard, Muncie, Ind.
C. A. Hamilton, Muncie, Ind.
O. H. D. Rohwer, Lehigh Portland Cement Co., Chicago, Ill.
Ed. Fillion, Chicago Portland Cement Co., Chicago, Ill.
J. E. Curtis, Wolverine Portland Cement Co., Coldwater, Mich.
G. E. Van Arsdale, Universal Portland Cement Co., Chicago, Ill.
G. A. Olsen, ROCK PRODUCTS AND BUILDING MATERIALS, Chicago, Ill.

The Logansport Meeting.

A spread which would have done justice to one of the finest hotels in the country was furnished by the New Barnett house, Logansport, Ind., Friday noon, Sept. 17, to five men who assembled at the hostelry for the purpose of studying retailers' conditions and the plan of improvement suggested by the National Builders' Supply Association. G. A. Olsen represented the association and outlined in detail the policy relative to district organizations. After finishing his remarks, he was asked numerous questions by the men present, who showed their interest in the movement by inquiring into the practicability of the plan. As at Muncie, the credit policy of the N. B. S. A. was thoroughly discussed and met with the approval of the retailers.

C. L. Dilley, of the C. L. Dilley Co., Logansport, is chairman of the local district and explained that the small attendance was no doubt due to the fact that ideal working conditions had been experienced for a week or more before the meeting and that the dealers were kept at home in order to supply the demand for material. He stated, however, and the rest of the dealers present backed him up, that a meeting would be held in the near future and strenuous efforts would be made to get an attendance of at least a score of dealers.

The Attendance.

Among those present at the Logansport meeting were:

A. W. Voorhees, Phillip Voorhees & Co., Logansport, Ind.
C. L. Dilley, C. L. Dilley Co., Logansport, Ind.
C. W. Closson, E. D. Closson Estate, Logansport, Ind.
A. O. Townsley, Burnetts Creek, Ind.
G. A. Olsen, ROCK PRODUCTS AND BUILDING MATERIALS, Chicago, Ill.

Lafayette Meeting Postponed.

A meeting of the retailers of District Number Four was slated for Wednesday, Sept. 15, but due to the absence of Secretary L. F. Desmond, who was detained at his home because of illness in the family, and the small attendance, the meeting was postponed until such a time as the secretary or one of his field representatives can be present.

PLEADS CAUSE OF SMALL TOWN DEALER.

A national law compelling manufacturers and jobbers to sell their wares to all retailers at uniform prices was advocated recently by Lieut. Gov. Barratt O'Hara at a membership conference of the Chicago Association of Commerce.

The rebates which Chicago merchants receive with their greater purchasing power is the fundamental reason for the ill will of business men downstate, according to Mr. O'Hara. A larger volume of business and friendlier business relations would result, he said, if discrimination were eliminated to the point of justice.

"The man who makes goods should be made to sell at a uniform price to all retailers," said the speaker. "If I may leave a suggestion with you I would inquire if it is not possible for the nation to enact such laws as may be suggested by business men themselves and will tend to bring the same buying possibilities to the small local merchant as to his big metropolitan competitor.

"The little merchant down state (referring to Illinois towns)—and he is the backbone of business prosperity down there—is complaining because he loses a part of his retail trade to the lower prices of Chicago. He is forced to buy his goods in single lots, while the man in Chicago buys by the dozen or the hundred. He nurses a grivance which affects vitally the business relations of Chicago and lower Illinois. Cannot the ill feeling be eliminated?"

NEWS of the TRADE

Building Shows Good Gain.

Building in the principal cities of the country for August shows a gain of 11 per cent over the corresponding period a year ago. This is between corresponding periods during the European war. August a year ago was the first month of the conflict. Permits were taken out in August in 102 cities for the construction of 22,900 buildings, involving a total estimated cost of $68,163,703, as against 21,239 permits aggregating $61,150,591, an increase of 1,661 buildings and $6,953,112, or 11 per cent, according to official reports to Construction News. This is even a better showing than that for August, 1913. If it is true that good times and bad times are first discernible in the larger cities, the situation is very much on the upturn, inasmuch as large increases are to be noted in the principal cities. The figures in detail are as follows:

Cities.	1913 No. of Bldgs.	1913 Estimated Cost.	1914 No. of Bldgs.	1914 Estimated Cost.	% Gain.	% Loss.
New York (Boros. Manh. and Bronx	572	$ 9,581,053	676	$ 5,718,519	66	..
Chicago	995	9,513,150	971	5,754,900	65	..
Boston (Metro. Dist.)	414	4,752,000	472	5,147,000	..	7
Brooklyn	1,071	3,999,697	949	4,292,600	..	11
Philadelphia	1,446	3,993,625	1,291	2,842,810	51	..
Detroit	764	3,217,400	595	2,353,445	36	..
Cincinnati	1,384	3,048,475	1,227	1,128,060	170	..
Cleveland	1,287	1,987,520	1,039	2,318,470	..	18
Buffalo	410	1,175,000	341	950,000	24	..
Milwaukee	527	1,073,099	502	672,329	51	..
St. Paul	223	1,066,026	208	646,922	65	..
Minneapolis	614	1,031,070	488	943,975	9	..
Los Angeles	632	1,001,960	756	1,267,498	..	33
San Francisco	588	970,090	479	1,415,271	..	31
St. Louis, Mo.	739	932,446	729	797,165	17	..
Bridgeport, Conn.	125	842,755	65	147,063	473	..
Rochester, N. Y.	275	772,174	240	808,457	..	4
Toledo	220	747,083	219	490,047	52	..
Washington, D. C.	460	742,773	469	627,472	18	..
Pittsburgh	278	740,365	353	1,127,069	..	34
Portland, Ore.	418	728,870	510	409,390	78	..
Kansas City, Mo.	337	725,830	254	527,295	38	..
Newark, N. J.	205	569,441	189	3,196,233	..	82
Columbus, Ohio	270	544,815	239	647,325	..	15
Worcester	154	534,558	132	679,692	..	21
Oakland	319	506,041	257	411,889	23	..
Akron	220	499,010	174	602,315	..	17
Indianapolis	614	463,972	497	572,436	..	19
Seattle, Wash.	784	454,960	797	1,565,525	..	71
Baltimore	209	447,923	220	1,012,846	..	56
Savannah	50	442,805	75	150,830	194	..
New Haven	141	440,274	109	500,567	..	12
Syracuse	182	404,000	153	256,948	57	..
Dayton	100	403,890	64	111,643	262	..
Springfield, Mass.	116	400,095	133	489,290	..	18
Atlanta	245	370,600	245	372,033	..	..
Omaha	126	350,610	123	521,065	..	33
Grand Rapids	153	281,765	151	268,877	5	..
Binghamton	123	278,917	113	193,619	38	..
Memphis	149	272,295	173	175,660	55	..
Erie	91	272,990	127	366,290	..	25
Duluth	179	262,051	160	238,023	7	..
Sioux City	53	258,975	51	223,485	16	..
Trenton	85	256,026	62	211,425	52	..
Albany	259	249,745	259	479,685	..	9
New Orleans	....	246,708	....	236,910	4	..
Utica	51	235,985	50	86,670	172	..
Salt Lake City	103	213,400	128	480,045	..	56
Allentown	44	208,585	25	79,311	163	..
New Bedford	94	197,260	73	175,550	12	..
Richmond, Va.	104	197,019	96	183,410	7	..
Paterson	117	193,827	68	221,958	..	17
Davenport	81	182,705	37	91,205	100	..
San Antonio	191	181,260	161	170,050	7	..
Reading, Pa.	43	181,150	23	29,400	516	..
Ft. Wayne	54	176,530	57	153,500	8	..
Dallas	98	135,117	99	220,175	..	29
Youngstown	88	154,815	103	261,565	41	..
Wilmington, Del.	61	154,368	63	203,059	..	24
Des Moines	57	151,500	48	111,150	36	..
Portland, Me.	31	142,995	34	140,973	..	1
Brockton	44	142,040	48	77,475	83	..
Passaic	29	137,826	27	36,665	275	..
Birmingham	569	137,615	380	314,519	..	55
Berkeley	112	134,900	99	161,750	..	16
Lincoln, Neb.	73	131,015	59	136,865	..	3
Cedar Rapids	37	125,000	53	282,000	..	60
Stockton	57	116,380	13	7,350	..	..
Canton	50	115,125	66	314,500	..	63
Peoria	46	114,810	58	243,051	..	53
Altoona	69	114,063	83	130,374	..	13
Superior	75	111,365	74	77,853	43	..
Springfield, Ill.	59	109,500	33	77,950	50	..
Haverhill, Mass.	44	108,100	35	96,925	11	..
Tampa	123	103,920	124	358,865	..	71
Pasadena	129	104,057	169	137,430	..	24
St. Joseph, Mo.	72	103,498	66	93,622	10	..
Evansville	141	101,455	125	78,493	29	..
New Britain, Conn.	50	94,865	38	57,225	65	..
Elizabeth, N. J.	34	94,748	23	91,199	4	..
Kansas City, Kans.	64	91,665	50	80,863	13	..
East St. Louis	57	91,420	56	67,977	34	..
Holyoke	19	88,975	13	130,175	..	31
Nashville	270	84,843	55	91,441	..	7
Scranton	55	88,779	51	185,388	..	52
Huntington, W. Va.	59	83,368	68	114,703	..	27
Troy	57	82,465	57	51,275	61	..
Norfolk	41	75,632	55	241,625	..	78
Saginaw	27	72,685	41	90,785	..	20
Topeka	50	66,719	36	39,399	227	..
Sacramento	110	62,953	111	62,253	1	..
San Diego	122	62,770	198	208,408	..	70
Wilkes-Barre	68	55,032	77	28,731	92	..
Tacoma	114	54,378	150	139,660	..	61
Spokane	72	50,325	53	31,585	60	..
Chattanooga	164	46,540	202	128,810	..	63
Auburn, N. Y.	18	41,474	21	68,373	..	39
Jacksonville, Fla.	34	40,565	60	161,705	..	70
Woonsocket	16	30,875	12	29,010	84	..
Hamburg, Pa.	22	29,325	31	101,275	..	71
Hoboken	18	21,565	13	12,645	70	..
Colorado Springs	13	6,975	23	16,882	..	59
Totals	22,900	$68,163,703	21,239	$61,150,591	11	..

August, 1913, 17,656, $57,986,592.
August, 1912, 19,739, $71,741,863.

There were gains in 55 and losses in 46 cities. New York leads with an increase of 66 per cent, follows with Chicago 65, Philadelphia 51, Cincinnati 170, Buffalo 24, Milwaukee 51, St. Paul 65, Minneapolis 9, St. Louis 17, Bridgeport, Conn., 473; Toledo 52, Washington 18, Portland, Ore., 78; Kansas City, Mo., 38; Oakland, Cal., 23; Savannah, 194; Syracuse 57, Dayton 262, Binghamton 38, Memphis 55, Duluth 7, Sioux City 16, Trenton 22, New Orleans 4.

The losses were as widely scattered as the gains. Beginning with Boston, there was a decrease of 7 per cent, Brooklyn 11, Cleveland 18, Los Angeles 23, San Francisco 31, Rochester 4, Pittsburgh 34, Newark 82, Columbus, O., 15; Worcester 21, Indianapolis 19, Seattle 71, Baltimore 56.

It is difficult to forecast what the future may bring forth, but there are upon every hand indications of pronounced improvement.

BRADSTREET REPORTS BIG GAIN.

New York, Sept. 18.—Bradstreet reports for building plan filings throughout the country for August shows a gain of 13.7 per cent over the like month a year ago. The gain shown is the largest reported in any month since early in 1913.

Except for a fraction of one per cent gain in expenditures in May this year, the percentage of gain shown in August is the first since July, 1914, and is the largest since early in 1913. Because of the slump in August a year ago the gain this year is a liberal one. But it is worth noting that with only 132 cities reporting, the grand total expenditure for August is only a little below the aggregate at 152 cities in 1913, and the month's full returns will undoubtedly show a total in excess of that of 1913, and next in importance to the high record August total of 1912.

The total value of the building expenditure at 132 cities for August this year was $63,907,981, a gain of 13.7 per cent over August, 1914, and comparing with a decrease of 14.4 per cent in July and 21.8 per cent in June and a gain of only three-tenths of one per cent in May. The number of permits granted in connection with this expenditure was 20,834, an increase of 6.3 per cent over August last year.

Not quite half the gain at the entire 132 cities is furnished by New York, three boroughs reporting. New York gains 34.6 per cent over a year ago in August; Chicago shows an even larger quantitative gain than New York, $3,744,000 against $3,372,000. This is an advance for Chicago of 64.8 per cent. Other good increases shown are those by Buffalo, 23.6 per cent; Philadelphia, 51 per cent; Cincinnati, 204 per cent; Detroit, 36.7 per cent; Milwaukee, 72.7 per cent; Minneapolis, 9.3 per cent; St. Paul, 65.9 per cent.

Large decreases are reported by Newark, N. J., 82 per cent; Pittsburgh, 34 per cent; Cleveland, 14 per cent; Los Angeles, 6.9 per cent; San Francisco, 31 per cent; Seattle, 71 per cent.

	No. of cities.	No. of permits.	Values.	Compared with last year. No. of permits.	Values.
New England	19	1,342	$ 4,852,193	I 31.4	I 42.6
Middle	25	4,162	23,096,687	I 1.0	I 10.7
Western	19	3,767	11,088,313	I 14.6	I 25.4
Northwestern	15	2,773	14,511,830	I 20.4	I 46.8
Southwestern	14	1,913	2,517,849	D .7	D 2.6
Southern	22	2,876	2,885,413	I 23.0	D 27.8
Far western	18	4,001	4,955,696	D 12.8	D 25.1
Total U. S.	132	20,834	$63,907,981	I 6.3	I 13.7
Canada	9	536	869,520	D 31.0	D 61.7

New Orleans Market Uncertain.

New Orleans, La., Sept. 18.—New Orleans building material men are facing a season that is at once both dull and active. It is dull in building specialties, but for the commoner materials there is quite a healthy demand. Those having street paving materials for sale are finding a ready market, although one in which there is much competitive bidding. New Orleans is spending about $3,000,000 in street making and street repair work. Under Commissioner Lafaye's leadership, the citizens are having their choice in the selection of the paving material to be used. It was announced that these selections had been made on Sept. 15.

Individual opinions gathered from building material men in this city indicate that the trade is not enjoying all the business it should, but nevertheless it is hopeful. Residential construction has been on somewhat of a boom; though commercial construction is slack with the exception of a few tremendous contracts, mentioned before in these columns, such as the $5,000,000 cotton warehouse, the $3,000,000 Texas and Pacific station, etc.

Ole K. Olson, who returned recently from a business trip in Florida, declares his firm has not been very busy during the past few months. Enameled brick, of which Mr. Olson makes a specialty, is dull.

J. J. Vogel, head of the J. J. Clarke Co., New Orleans, states that his company has been busy, principally on ratproofing work.

The Salmen Brick and Lumber Co., Whitney-Central building, is placing 1,000,000 sewer bricks in Prytania street in the construction of manholes. The company reports that there is quite a healthy movement on in hard wall plaster, though in other lines orders are scarce.

A splendid note of optimism comes from Walter Jahncke, of Fritz Jahncke, Inc., New Orleans. While he says that building operations in New Orleans are holding their own, there is distinct dullness in the specialty lines, and he remarks further: "Our own firm is not particularly busy, but so confident are we in eventual prosperity, that we are still keeping our old force, and up to date have not let a single one of our many employes loose. When the market is not good for sand, for example, we set our towboats busy on something else, so you see that at all times we have something to do. We may be gambling wrong; but I don't think so, nor do my brothers."

EASTERN CANADA REPORTS ENCOURAGING.

Toronto, Sept. 18.—The building returns for Eastern Canadian cities, especially those not in the big class, are very encouraging. St. John and Sydney in the maritime provinces, and Brantford, St. Catharines, Windsor, Woodstock, Chatham and Stratford in Ontario, all show increases.

The value of the building permits in Toronto for the eight months of 1915 is $4,622,791. In Montreal for the same period there were 1,439 permits valued at $4,161,362.

The Black Building Supply Co., Toronto, who are agents for several American products, reports that there are a large number of inquiries for special brick for fire places; that there is a distinct improvement and interest in rough texture brick, not only for fire places, but also better classes of residences. Other years people were more interested in smooth faced brick.

Pittsburgh Trade Slowing Up.

Pittsburgh, Sept. 18.—In general, retail trade is slackening up. Building operations have not been coming forward in large enough volume to keep up the trade. Orders from retailers are as a rule spotted and irregular. In some towns, especially the industrial towns which are flushed with war orders, there is a very good business. In other places, except for repair work, there is very little doing. In the city, building is at a comparatively low ebb; that is, the kind of building that helps retail dealers most. The few very large structures which are going up down town are not giving to the general line of trade so much business as one-third that amount invested in smaller buildings in the outskirts.

Business conditions in general are much improved. Steel plants are running at full capacity night and day in nearly all parts of this district. Not only war orders are immense but domestic trade is coming back in a very encouraging way. This is going to promote a large amount of building but it will not be in time for fall trade.

In street work many contractors are about done. Others have enough to carry them on well toward the first of the year. Pittsburgh is producing more than the usual amount of trade in this direction because of the filling in of the streets in the flood district. An enormous amount of material is being used for this purpose as the fill is from two to eight feet deep. With the exception of the railway companies, however, comparatively little sand is being used. Competition in all lines of builders' supplies is exceedingly keen. It is largely a buyers' market and the contractor or concern which has ready money is able to name its own price in many cases. Industrially and financially, Pittsburgh is better off than at any time for five years. This condition is bound to be reflected very soon in an increasing amount of business for dealers in builders' supplies, but pending that time business is sadly lacking in profitable volume.

PACKARD COMPANY PLANS IMPROVEMENTS.

Detroit, Sept. 18.—With 8,200 employees at work, making up the largest payroll in its history, and orders for its product coming in greater volume than ever before, the Packard Motor Car Co. has found it necessary to provide large extensions to its Detroit plant. At the present time, additions comprising nearly 400,000 square feet of floor space are nearing completion. To get the picture of what this means in the aggregate, imagine a single floor 400 feet wide and 1,000 feet long. The buildings now under way will cost approximately $750,000 and will bring the total floor space area of the Packard plant to 48 acres.

Work is now going forward on additions to the stamping department, forge, foundry, pattern-shop, heat treatment building, truck assembly department, truck stock, service department and car finishing department. The improvements include also a new blacksmith shop 200 feet long and a five-story steel and concrete building 400 feet long, for the machining of chassis parts.

BOSTON BUILDING CONTINUES ACTIVE.

Boston, Mass., Sept. 18.—Building permits amounting to $3,257,000 were reported in Boston district during the first half of September by the F. W. Dodge Co., representing 238 projects started. This was half a million more than the preceding fortnight and the total to Sept. 15 in New England stands at about the same figure ahead of last year. Material jobbers report restocking in progress in a fair way throughout the field, although the fall business does not seem to have the heartiest and fullest swing to it expected of the building and other conditions.

The general industrial outlook calls for more buildings. There is strong optimistic opinion in the mill sections, which means practically all of New England, that the situation of making goods for all the rest of the world already present will continue for some years to come. The investment market shows the strength of this opinion.

On Thursday last the state executive council put the seal of its approval on the big drydock contract here, a joint project of over $3,000,000 between the state and the federal government which has been hanging fire for several months.

Among projects worthy of exceptional mention are the proposed 10-story fireproof business and office block on High street for the Rice-Hutchinson Co., shoe manufacturers; the enterprise of the High Street Trust, to be constructed of steel and concrete at an approximate cost of $350,000; a four-story fireproof building for the General Film Co. to cost above $100,000; also contract let for the S. K. Club house in Cambridge, to cost $30,000.

CINCINNATI BUSINESS TAKES SPURT.

Cincinnati, Ohio, Sept. 18.—In spite of the comparative lateness of the season, the warm weather experienced in the early part of the month encouraged a good deal of building which would otherwise have been postponed until next spring. There is no doubt but what the uncertainty in financial and general business circles caused by the war has resulted in much less building than would normally have been the case, but it is also true that the extremely rainy season has interfered largely with work; and the mild and sunny weather of this month has caused an appreciable spurt in building, which may be kept up if only the fall continues to be favorable as to weather.

The Moores-Coney Co. reports a fair business recently, considering the fact that the fall has set in. Small work continues to be the rule, the number of residences of the better sort under way being unusually large, as shown by the building commissioner's list of permits. The company is now making delivery on several good-sized jobs landed some time ago, however, notably the new buildings at the University of Cincinnati. This company will supply the lime, sand and gravel for use in the new Hamilton county courthouse.

IMPROVEMENT EXPECTED AT COAST RESORTS.

Boothbay Harbor, Me., Sept. 18.—Here, in the center of coast summer resorts, building material demands are expected to pick up considerably at the close of the summer period. As a rule there is very little building here during what is called "the season," that is July and August, when boarders and tourists come and all the time of business people is taken up in tending to their wants. The same condition obtains all along the coast and very little is looked for in the building line except before and after the "season," in the spring and fall months.

LOUISVILLE DEALERS KEPT BUSY.

The Tyler Building Supply Co., in spite of the supposed dull season, reports that business has been holding up unusually well. A large number of smaller orders have been secured.

It has been reported by H. H. Frazer, sales manager for the R. B. Tyler Co., that business has been exceptionally good, and that sales for July and August exceeded sales in the same months of the preceding year to a very large extent. They are at present furnishing face brick and other materials on quite a large number of orders.

Mr. Teague, of the Union Cement and Lime Co., reports that the company, though not rushed with orders, is enjoying a good, steady business. In addition to several city orders, the company has secured some large country orders in the neighborhood of Louisville.

BUILDING PERMITS DOUBLE IN CHICAGO.

Building conditions in Chicago are improving, according to records in the office of Building Commissioner Charles Bostrom.

Almost twice the amount of money was spent for building construction during the first three weeks of September, 1915, as was spent during a similar period in 1914.

The figures are: Sept. 1 to 18, inclusive, this year, permits for buildings which will cost $5,304,804 were issued. Sept. 1 to 19 inclusive, 1914—one day longer than the 1915 period—the permits aggregated only $2,997,050. This year in the period of comparison, 523 permits were issued; last year, 400.

AUSTIN, TEX., SHOWS IMPROVEMENT.

Austin, Texas, Sept. 18.—All lines of building trades show an improvement over that of two weeks ago. Cotton is moving in large quantities since the price rose to around 10 cents per pound. The money derived from that crop as well as from the sale of wheat and other grains is passing rapidly into general circulation. It is stated by architects and contractors of Austin and other cities and towns of the state that prospects are favorable for an unusually busy fall and winter. Many persons who had deferred their building plans, pending the outcome of the crop season and an improvement in the general financial situation of the country, are now ready to proceed with the work. The Mexican troubles on the lower Rio Grande border have had a depressing effect on development operations in that particular and limited section of the state, but it is such a small area of the commonwealth that it is insignificant in its importance.

MILWAUKEE COLLECTIONS INDICATE PROSPERITY.

Milwaukee, Wis., Sept. 18.—One of the most encouraging signs in the general business field and one which seems to give promise of plenty of activity in the building situation is the fact that collections are showing decided improvement.

James A. Fetterly, secretary of the retail merchants' division of the Merchants and Manufacturers' Association of Milwaukee and manager of the credit bureau conducted by the organization, made the statement to a representative of ROCK PRODUCTS AND BUILDING MATERIALS that collections in the Milwaukee retail field have been better than 100 per cent normal during the past two weeks. Mr. Fetterly accounts for this encouraging feature by the fact that business in the manufacturing field has increased to such an extent of late that there are now very few people out of work and there is a tendency to pay up long standing accounts. He believes that greater freedom in buying will now result. Practically all the machinery manufacturing plants of Milwaukee are now operating at better than 80 per cent of their capacity, a fact which means much, since the iron, steel and machinery business heads the lists of industries in this city. Some concerns are busy on war orders, but many houses are operating near the capacity mark without a single foreign order on their books. The Milwaukee branch plant of the Illinois Steel Co., for instance, is operating 85 per cent of its capacity and has turned down all war orders.

The plants of the T. L. Smith Co. and the Koehring Machine Co., manufacturers of concrete mixing machinery, are operating full capacity.

Permits for the erection of several large structures in Milwaukee have been issued by Building Inspector W. D. Harper, and he says that the record for the month will attain a new high mark. During the past week there were 63 permits issued for structures to cost $212,341, as compared with 74 permits and an investment of $193,870 during the corresponding period a year ago.

Efficiency in the Building Material Yard

BY F. E. DAVIDSON.

The problem of how to lay out a building supply yard to secure the maximum of efficiency is one of great importance, not only to the dealer but to all contractors who are customers of the dealer, and indirectly to all owners of buildings, who finally pay for the material handled and used.

In a properly laid out building supply yard, all materials are handled with a minimum of expense, resulting in larger profits to the dealer, while the ability to secure building materials promptly results in a saving to contractors. Thus in the end a dealer who has a building yard properly laid out will be enabled to undersell competitors, enabling contractors to reduce their estimates, and in this way ultimately effect a saving to the owner, who finally pays all construction bills.

In laying out a building supply yard, the problem must be approached from the viewpoint of economy in the handling of material, and this of course presupposes adequate space for switch tracks, as well as storage room.

The writer during the past few weeks has interviewed many material dealers, and has been unable to find any material dealer who is in position to show by figures the actual cost of storing or handling any class of building material. This lack of adequate cost records, of course, leaves the dealer absolutely in the dark as to what the relative profits or losses on various materials actually are. The profits may be large on some classes of material, and he may be, and no doubt is, actually handling various other materials at a loss. A model material yard will be so arranged that the actual cost of storing and handling each class of material may be readily determined, and will be so laid out as to utilize switch tracks for the storage of materials, as during the busy season, when material is moving very rapidly, it will often be economical to pay demurrage on cars of material. At the same time all switch tracks should be so laid out that material may be either unloaded directly to the delivery trucks or to the storage quarters.

The plant is assumed to be located directly on a public street, and adjacent to the main line of some railroad, and in the grouping of the various buildings it will be noted that the space allotted to lumber storage is as far away from the main line track as it is possible to locate same, in order to reduce the fire hazard. The stable is located not only away from the main line track, but away from the street, not only to reduce the fire hazard, but for the reason that in some localities the odors of a stable, while they are not unhealthy, are objectionable. All team ways in the entire yard should be paved, and the top of rail in all cases should be level with the pavement adjacent to same. The roofs over the storage sheds may be extended out in the form of canopies far enough on each side to provide some protection for wagons and trucks. In the construction of the shed for brick storage, I think it desirable that same be designed with the idea that it may be easily remodeled into additional warehouse space in case the need should arise.

In laying out the switch tracks and teamways, particular attention should be given to their location to facilitate the rapid and economic handling of material. The switch tracks, warehouses and storage sheds should be arranged so that material may be either unloaded directly from the car, or transferred to the warehouse or storage sheds. The teaming courts should be of sufficient width to provide ample room for trucks to pass without interfering, and in the design of the warehouse and storage sheds it is my judgment that it will ultimately be more economical to have the floors of same so located in elevation that on the track side the floor will come level with the average car platform, and then to provide a slope or pitch in the floors toward the loading platform on the opposite side. Floors should not be pitched more than at the rate of about 10 inches in 100 feet. This will facilitate the handling of materials to the trucks or wagons. I further believe that it will be found more economical to use one-story sheds for the storage of all classes of building material than to attempt to utilize less ground area by constructing buildings of two or more stories. In other words, it will be found that the extra carrying charges on the additional land required will be materially less than the extra expense of handling bulky materials in a two- or three-story warehouse. This, however, will be governed quite largely by the land values in the location where the yard is situated. It is my judgment that with land valued at anything less than $1.50 per square foot, it will prove cheaper to utilize one-story warehouses than buildings of greater height.

A word might be said with regard to the construction of the warehouse sheds proper. All that need be provided as shelter for all classes of material, excepting mortar colors, cement and plaster products, is a shed of the simplest form of construction, all that is needed being a death-erproof roof, and in some cases side walls; but buildings used for the storage of mortar colors, cement or plaster products should have either brick or tile walls, and I believe should also have concrete damp-proof floors. I have made some investigation regarding the loss of materials, due to slaking, etc., in storage warehouses where floors were constructed approximately level with the car platform, the floor itself being of the well known laminated wood floor construction, the space underneath the floor being open, and I have found that the floors will dry out, causing open spaces between the members of the floor construction, thus permitting moisture to enter the building through these openings, and in some cases resulting in a very material loss of the products stored therein. This loss may be prevented if the floor itself is not only of concrete, but is damp-proofed, and the first cost of construction will be materially less than the cost of a wood floor designed to support heavy loading.

One of the very important buildings to be considered in connection with any storage yard is a well-built and well-kept stable. The use of cork flooring in the stalls will in itself lengthen the life of the horse much more than is necessary to pay the cost of installing and up-keep of such a type of construction.

I am also of the firm belief that provision should be made for a home for the barn boss and watchman in connection with the design of any material yard. This may be provided in the form of a modern flat, constructed over the office section of the storage plant. In the design of the office, adequate provision should not only be made for the convenience and comfort of the employes of the plant, but it will pay to give due consideration to the convenience and comfort of customers who may call at the plant.

It is my thought that for the convenience of customers it will usually be found advantageous to have in the office a partial exhibit of the various materials carried in stock at the plant.

I am very glad indeed that the speakers who preceded me dwelt on the fact that if someone was sick in their home, they would not call in the lawyer; they have also let us know that business is sick, and I believe that I will second the motion because in our experience I find that business men are far sicker than they realize. There is a reason for that; the reason is they are not getting back all of the dollars that they put into the business. I know how it hurts to look at the empty bank account when you have a pay roll due next Friday and how it hurts to go to the banker and ask for some assistance when you have had a hard time to take care of your past obligations. I know, too, he will ask for a statement of your liabilities and assets; but even a banker does not know what it costs to conduct your account. We are finding in our experience with banks that the average manufacturer has an average of $150 daily balance in the bank. I know that when we approach the subject of cost and uniforms with an individual, he immediately says our business is too small or we are too busy or we are too slack or we have a small plant or small yard and it would not fit our place at all.

No matter how large or how small the man is, when he wants a suit of clothes he goes to the tailor. We have found in our cost work that there are a few members that will apply to every business, from the business man who produces labor to the business man who conducts the manufacturing institution and the merchandising house. When you pin a man down, you soon find out he does not as a rule know anything about it.

There were 16,759 failures last year; salesmanship and service organizations do not solve the problem, either; neither do credit bureaus, because we have been in concerns where they had all three institutions working fine and still were going down hill. The reason was they did not know their cost; they figured from the selling price backwards. A concern in Ohio had a factory and store, but were figuring backward; we will get the cost and then make the selling price afterward, but it is hard to get men to see that it is just as easy to find the cost no matter what you are handling as it is that two times two equals four.

The new principals that we employ deal with three forces of the production, merchandise, labor and capital.

Let us take up the matter of capital first, which is divided into four general groups; first, capital is invested in the human machine; we do not know how to handle the wage question because we do not know how much it costs to raise the human machine. Hence, we have land, buildings and other things. A gentleman made me very forcibly understand he knew his cost. I said you own property? Yes. How much rent do you figure? I do not figure any rent; I own it. The interest on the capital invested in the property amounted to $14,000 a year that he was not getting back.

We have one client whose open accounts run over $3,000,000 and his contracts are so handled that nine months must go by before he gets a return; he is a manufacturer; he is a big banker, as well. If we do not get interest back on our commercial investments, bank balances, working processes, accounts receivable, etc., we have another big loss without going into the yard to work.

The manufacturing of a product is not so intricate when you look at it from a business standpoint. In making his product, a manufacturer uses two elements only, the material and labor.

From your standpoint we have arranged a system that is very simple and that we use in any manufacturing line. It consists of four forms. A distribution sheet. Take it from the standpoint of the merchant who sells brick, plaster, coping, cement, etc. You have your office located at the yard; you sell something besides this material; you sell a lot of time. Some of you are employing three, 10, 20 or 30 men—a lot of time to sell in connection with your product. That time should be distributed on shop time cards and distributed among the different commodities you handle.

The selling expense is not made up alone of the salesmen's salaries. You have traveling expense, bad debts, once in a while, collection expense, advertising expense, interest on commercial investment, interest on capital invested in commodities which must come back through selling expense.

The more I go into business institutions the more I really believe society is what we might call bankrupt, which is due to not understanding cost. Another thing, no matter where we go, what flag we are born under or what the color of our skin is, we all pay costs; it is a law of nature and because we do not know what that price is—because we do not understand a few of nature's laws—we are up against it so hard.

SHREVEPORT TO ELIMINATE WOODEN ROOFS.

Shreveport, La., has completed a proposed new building code which if adopted will do away with wooden roofs entirely, substituting instead roofs of brick, concrete, tile, slate, metal, asbestos shingles, prepared or other roofing approved by the city building inspector. It is stated that the new ordinance has been proposed for reducing fire risks.

BUILDING FLOURISHING IN HOLLAND.

Building material manufacturers and dealers are reported to be very busy, as all over the country building conditions are flourishing. This is not on account of prosperous times, but owing to the influx of Belgium and other refugees, of which there are over a million in Holland, apart from the tens of thousands interned soldiers. As the population of Holland is in ordinary times about six million persons, this means an increase of about 17 per cent. It is impossible to locate these people permanently in citizens' houses. As many of the Belgiums plan to remain in Holland, the empty houses were soon occupied and building of new ones is in full swing, as builders expect to sell or rent them readily.

C. T. PATTERSON PASSES AWAY.

C. T. Patterson, president of the C. T. Patterson Co., of New Orleans, one of the best known contracting and machinery concerns in the South, died in the Crescent City recently, aged 53 years. He came to New Orleans 25 years ago, and entered business life in that city as branch manager of Henry Disston Sons of Philadelphia. He remained with this firm until he organized his own concern in 1898.

His will was filed in the Civil District Court late in August. He bequeaths blocks of stock in the C. T. Patterson Co. to brothers, sisters and other relatives, and leaves the residue of the estate to his wife. His will contained the following request: "I particularly desire that the business of C. T. Patterson Co., Ltd., be continued three years or more under the management of my present partner, W. P. Simpson, if he should survive me. If he should not survive me, I request that the business of the corporation be liquidated at once."

Questions and Answers

ROCK PRODUCTS AND BUILDING MATERIALS is called upon to answer hundreds of questions relative to the manufacture, use, handling and sale of building and road construction materials. For the purpose of creating interesting discussions and thereby throwing greater light on these subjects, as well as to furnish inquirers with additional information, a few of these questions will be printed in each issue henceforth.

Answers, containing information of value to the industry, will be published. In answering, refer to box numbers, addressing your replies to the Questions and Answers Editor.

Question No. 1—I am contemplating a change in power at my quarry. I have been using steam, but boiler and engine are getting old. I can get electric current from the city and want to know if there is a drill on the market that operates by electricity direct. I understand the system of using an air compressor, but I don't want to transfer the transmission of the power as it makes too much friction. Will thank you for any information you can give. Address, Box 10.

Question No. 2—Will you please advise us what experience you have had in shipping a high calcium lime oxide in any other form than in wooden barrels? We have been given to understand that a burlap sack lined with an oil or other waterproof sack has been used successfully and we would appreciate some advice from you together with some reference as to a company handling this line of package. Address, Box 11.

Question No. 3—We should be pleased to have you give us the names of any firms such as roofing paper factories or any other manufacturers that are users of pulverized limestone. Address, Box 12.

Question No. 4—Can you advise me from whom I can get information in regard to Fuller's earth? I have a quantity of it and wish to ascertain where machinery for preparing it for market can be had and how to find a market for it. Address, Box 13.

Question No. 5—Please inform me how to mix and what process to use in making concrete ornamental work of granite and marble, etc., and the process of polishing. Where can the above named materials be obtained at a minimum price? Address, Box 14.

CONCRETE

Concrete Road Conference Committees Appointed.

Seventeen sub-committees have been appointed for the Second National Conference on Concrete Road Building, which is to be held at the Auditorium Hotel, Chicago, Ill., Feb. 15-18, 1916. According to J. P. Beck, secretary of the conference, all of the men named on these committees have been invited to attend the sessions and have accepted appointments to serve on the committees. The personnel of the sub-committees is as follows:

Drainage and Preparation of Sub-Grade—

Chairman, Hector J. Hughes, chairman School of Engineering, Harvard University and Massachusetts Institute of Technology, Cambridge, Mass.
Clinton Cowen, state highway commissioner, Columbus, Ohio.
George W. Cooley, state engineer, Minnesota State Highway Commission, St. Paul, Minn.
George A. Quinlan, county superintendent of highways, Chicago.
Edward T. Beck, Edward T. Beck & Co., contractors, Cuba, N. Y.

Economical Widths of Pavement and Shoulders—

Chairman, J. J. Cox, instructor in civil engineering, University of Michigan, Ann Arbor, Mich.
William W. Marr, chief state highway engineer, Springfield, Ill.
William A. Stinchcomb, county surveyor, Cuyahoga County, Cleveland, Ohio.
A. J. Rockwood, consulting engineer and contractor, Rochester, N. Y.

Problems of Design, Thickness, Crown and Grade—

Chairman, Ira O. Baker, professor of civil engineering, University of Illinois, Urbana, Ill.
Thomas H. MacDonald, highway engineer, Iowa State Highway Commission, Ames, Iowa.
H. L. Bowlby, executive officer, Pacific Highway Association, Portland, Ore.
Eugene W. Stern, chief engineer of highways of Manhattan, New York, N. Y.
R. C. Hunt, contractor, Washington Court House, Ohio.

Aggregates—

Chairman, D. A. Abrams, instructor in charge, structural materials research laboratory, Lewis Institute, Chicago.
W. K. Hatt, professor of civil engineering, Purdue University, Lafayette, Ind.
Charles F. Shoop, assistant professor of experimental engineering, University of Minnesota, Minneapolis, Minn.
H. S. Mattimore, assistant to first deputy commissioner, in charge of physical testing, New York State Highway Commission, Albany, N. Y.
A. S. Rea, engineer of tests, Ohio State Highway Department, Columbus, Ohio.

Handling and Hauling Materials and Water Supply—

Chairman, T. R. Agg, professor in charge of highway engineering, Iowa State College, Ames, Iowa.
H. G. Shirley, chief engineer, Maryland State Roads Commission, Baltimore, Md.
Edwin N. Hines, chairman, Board of County Road Commissioners, Wayne County, Detroit, Mich.
R. N. Waid, national road engineer, Ohio State Highway Department, Columbus, Ohio.
E. H. Cowan, vice-president, The Farrell Engineering & Construction Co., contractors, Cleveland, Ohio.

Organization of Concreting Crew—

Chairman, H. P. Gillette, editor-in-chief, Engineering and Contracting, Chicago.
E. I. Cantine, state highway engineer, Oregon State Highway Commission, Salem, Ore.
William F. McVaugh, county engineer, Madison County, Anderson, Ind.
Walter Buehler, civil engineer, Smithville, Minn.
O. T. Dunlap, Dunlap-Dippold Co., contractors, Edwardsville, Ill.

Proportions of Materials and Consistency of Concrete—

Chairman, W. S. Gearhart, Kansas state engineer, Manhattan, Kan.
A. N. Talbot, professor of municipal and sanitary engineering, University of Illinois, Urbana, Ill.
W. M. Acheson, division engineer, New York State Highway Commission, Buffalo, N. Y.
H. S. Van Scoyoc, chief engineer, Toronto-Hamilton Highway Commission, East Toronto, Can.
F. L. Rice, F. L. Rice & Sons, contractors, Shelby, Ohio.

Mixing and Placing Concrete—

Chairman, Ernest McCullough, civil engineer, Chicago.
A. D. Williams, chief engineer, State Roads Commission of West Virginia, Morgantown, W. Va.
John Wilson, civil engineer, Duluth, Minn.
Ernest Ashton, chemical engineer, Lehigh Portland Cement Co., Allentown, Pa.
G. E. Scott, contractor, Norwalk, Ohio.

Reinforcement—

Chairman, Richard L. Humphrey, consulting engineer, Philadelphia, Pa.
Leonard S. Smith, professor in charge of highway engineering, University of Wisconsin, Madison, Wis.
J. S. McCullough, city engineer, Fond du Lac, Wis.
Richard L. Saunders, deputy highway commissioner of Connecticut, Hartford, Conn.
R. M. Hudson, contractor, Atlanta, Ga.

Joint Location and Construction—

Chairman, George A. Ricker, ex-first deputy commissioner, New York State Highway Commission, Albany, N. Y.
H. J. Kuelling, county highway commissioner, Milwaukee County, Milwaukee, Wis.
Fred C. Smith, city engineer, Sioux City, Iowa.
E. D. Boyer, engineer, The Atlas Portland Cement Co., New York, N. Y.
Austin W. Summers, contractor, Buffalo, N. Y.

Expansion and Contraction—

Chairman, F. E. Turneaure, dean, College of Mechanics and Engineering, the University of Wisconsin, Madison, Wis.
Paul D. Sargent, chief engineer, State Highway Commission, Augusta, Me.
Gaylord C. Cummin, city manager, Jackson, Mich.
W. A. McIntyre, chief road engineer, Association of American Portland Cement Manufacturers, Philadelphia, Pa.

Finishing and Curing—

Chairman, Charles Whiting Baker, editor-in-chief, Engineering News, New York, N. Y.
W. A. McLean, engineer of highways, Department of Public Works, of Ontario, Toronto, Ont.
H. M. Sharp, deputy state highway commissioner, State Highway Department, Columbus, Ohio.
William M. Kinney, inspecting engineer, Universal Portland Cement Co., Chicago.
Howard W. Underwood, Field, Barker & Underwood, contractors, Philadelphia, Pa.

Construction of Shoulders and Curbs—

Chairman, A. N. Johnson, highway engineer, Bureau of Municipal Research, New York, N. Y.
A. W. Dean, chief engineer, Massachusetts Highway Commission, Boston, Mass.
A. B. Fletcher, highway engineer, California Highway Commission, Sacramento, Cal.
Charles E. Russell, county superintendent of highways, Lake County, Waukegan, Ill.
Edward M. Laing, president, Edward M. Laing Co., contractors, Highland Park, Ill.

Methods and Cost of Maintenance—

Chairman, A. H. Hinkle, deputy highway commissioner, Ohio State Highway Department, Columbus, Ohio.
L. C. Herrick, county engineer, Norwalk, Huron County, Ohio.
John W. Mueller, civil engineer, New Castle, Ind.
Maurice Hoeffken, Hoeffken Bros. Supply and Construction Co., contractors, Belleville, Ill.

Form of Specifications—

Chairman, A. R. Hirst, state highway engineer, Wisconsin Highway Commission, Madison, Wis.
F. F. Rogers, state highway commissioner, Michigan State Highway Department, Lansing, Mich.
C. B. Breed, consulting engineer, Boston, Mass.
F. P. Wilson, city engineer, Mason City, Iowa.
R. D. Baker, The R. D. Baker Co., contractors, Detroit, Mich.

Cost of Construction—

Chairman, C. J. Bennett, state highway commissioner of Connecticut, Hartford, Conn.
H. Eltinge Breed, first deputy commissioner, New York State Highway Commission, Albany, N. Y.
E. J. Mehren, editor-in-chief, Engineering Record, New York, N. Y.
C. U. Boley, city engineer, Sheboygan, Wis.
Frank A. Windes, Windes & Marsh, contractors, Winnetka, Ill.

Estimating and Inspection Problems—

Chairman, A. Marston, dean and director, Division of Engineering, Iowa State College, Ames, Iowa.
John H. Mullen, deputy state engineer, Minnesota State Highway Commission, St. Paul, Minn.
K. H. Talbot, division engineer, Universal Portland Cement Co., Pittsburgh, Pa.
H. A. Johnston, contractor, Kalamazoo, Mich.

MORE CONCRETE FOR GALVESTON.

Galveston, Texas, Sept. 18.—An addition of 1,000 feet to the reinforced concrete archway of the giant causeway that spans Galveston Bay is to be constructed at an estimated cost of $1,500,000. The decision to make this substantial improvement to the structure that gives the island and city of Galveston connection with the mainland was reached at a conference of the higher officials of the several railroads that enter Galveston. These lines embraced the Southern Pacific, the International & Great Northern, the Gulf, Colorado & Santa Fe, the Missouri, Kansas & Texas, and the Galveston, Houston & Henderson. The proposed 1,000-foot addition will be of the same type of construction as the archway portion that weathered the recent tropical hurricane so admirably. It will replace the sand-filled approaches that succumbed to the elements during that trying ordeal. When the archway extensions are finished, the causeway will have cost a total of approximately $3,500,000. It is stated that it will then be one of the greatest structures of its kind in the world.

A GREAT CONCRETE SEAWALL.

One of the largest construction firms in the world is constructing Victoria's (B. C.) huge seawall—the Sir John Jackson, Limited. One hundred and fifty feet of concrete superstructure was added to the breakwater during the past month. Good progress was maintained by the contractors on all sections of the large contract. About three-quarters of the entire length of the breakwater has been completed, but owing to the difficult nature of the last section of the contract, many months will elapse before the great seawall is complete.

From now on the contractors have to contend with unfavorable tides, as the extreme low tides are at night time and consequently all foundation work has to be carried on throughout the night. Under these circumstances the progress on the final sections of the breakwater will be slower. Night work is now under way and with powerful lights operating from advantageous points the scene after dusk in the immediate vicinity of Ogden Point is a brilliant one.

Some idea of the extent of the work that has been accomplished since the breakwater contract was taken over is indicated by the following statistics supplied by J. S. Maclachlan, Dominion government supervising engineer for the breakwater and piers. The total amount of "core" or fine rock, deposited to date is 249,925 tons; and rubble, or coarse rock, 712,884 tons.

From the time the contract was started no less than 66,373 tons of granite blocks have been deposited and 2,978 cubic yards of concrete facing, 18 inches in thickness, has been completed, while a total of 12,366 cubic yards of concrete superstructure has been laid.

During the month of August, 27,322 tons of rubble was dumped; 7,260 tons of granite blocks placed; 396 cubic yards of granite concrete facing completed, and 1,646 cubic yards of concrete superstructure laid.

NEW INCORPORATIONS AND VENTURES.

Western Concrete & Tile Co., Pueblo, Colo.; capital, $10,000; incorporators, Ralph Dorst, A. D. Markham and H. P. Vories.

Ashland Reconstructed Stone Co., Ashland, Ky.; capital, $20,000; incorporators, Sam Collier, H. V. Fisher, William Erwin, H. H. McIntosh, B. S. Davis and W. B. Pelfry.

Manchester Cement Products Co., Manchester, Ia.; capital, $1,000; incorporators, C. K. Reading, W. L. Davis and C. J. Hockaday.

The Home Builders' Cement Products Co., River Rouge, Mich.; capital, $5,000.

Concrete Flooring Co., Newport, Ky.; capital, $50,000; incorporators, Fred A. Dole, Fred C. Evers, Gus Sauer and Henry Schroeder.

Concrete Brick Co., Providence, R. I.; capital, $200,000; incorporators, William H. Pearce, Pawtucket; Gilbert F. Whipple and George A. Rounds, Providence, R. I.

Nascho Silo Co., Waco, Tex.; capital, $20,000; to construct concrete silos; incorporators, Luke Moore, Jr., Charles E. Moore and F. W. Starr.

Helena Ornamental & Press Brick Co., Helena, Ark.; capital, $10,000; to manufacture ornamental and face brick, artificial stone caps, sills, concrete blocks, etc.; W. V. Deering, president; W. F. Castle, vice-president and manager, and K. Deering, secretary-treasurer.

Frank R. White Manufacturing Co., Washington, D. C.; capital, $1,000,000; to manufacture concrete railroad ties; J. W. Galloway, president, Baltimore, Md.

Concrete Brick Co., Providence, R. I.; capital, $200,000; incorporators, William H. Pearce, Gilbert F. Whipple, George A. Rounds.

National Concrete Bridge & Culvert Co., Tecumseh, Okla.; capital, $25,000; incorporators, E. L. Rosebush and others.

Test Cement Drain Tile.

The durability of cement mortar and concrete when exposed to concentrated alkali salts in soil and water has been questioned by many engineers and users of concrete. In the Western states many irrigation and other structures have been built of concrete in alkali soils and cases of partial or complete failures of some of these structures have been attributed to the effect of alkali salts. The results of the first year's tests made by the Bureau of Standards, of the Department of Commerce, in investigating this question have just been published by that bureau in Technologic Paper No. 44.

Laboratory investigations have shown that cement concrete is subject to disintegration by alkali salts under certain conditions, but practical experience has shown that some concretes are much less susceptible to the action of the salts than others and are quite permanent, even if exposed in very concentrated alkali soils. It was intended in outlining this investigation to make it an actual field test of practical, full-sized specimens composed of concrete of known composition, so that all conditions might be similar to those in which structures are exposed in the field.

In 1913 a committee consisting of a representative from the United States Reclamation Service, the drainage division of the Department of Agriculture, the Association of American Portland Cement Manufacturers and the Bureau of Standards outlined a program of tests to determine the effect of alkali on cement mortars of a known commercial quality. Since several millions of dollars are being spent annually in the drainage of alkali soils in the Western part of the United States, and because of its economic importance, it was considered advisable to make observations on cement drain tile of known composition which would be exposed under normal service conditions in operating drains in concentrated alkali soils.

Over 8,000 cement drain tile, 12 inches long and eight inches inside diameter, were manufactured in a commercial tile factory in Iowa during August and September, 1913. They included 16 different types, made up of mixtures from the leanest to the richest commercially practicable. Records were kept of all steps in the process of manufacture. care was taken to produce a uniform and good quality of product, but no methods or materials were introduced which could not be reproduced in any well-equipped cement tile factory.

After all tile had cured for a period of at least one month shipments of a carload were made to projects in each of the following states: Colorado, Wyoming, Montana, Washington, Arizona, New Mexico, Utah, Minnesota and Missouri.

The tile were installed in the first seven states in soils which contain large quantities of alkali salts, and where concrete structures were thought to have been damaged by alkali action. The tile in Minnesota and Missouri were placed where they would be exposed only to fresh water, and a separate shipment was made to Ames, Iowa, where the tile were stored in the open, above ground, and exposed to the weather.

Installation was completed in November, 1913, and the tile were so arranged that sections at each project containing two tile of each series can be removed for test annually without disturbing the remainder of the line. Ten such sections were placed end to end at each project. Samples of soil, water, and alkali salts, where available, were secured for analysis.

The first year's tests were made in the fall of 1914. One section at each project, containing 32 tile, two of each series, were removed and tested at the site in a portable tile-testing machine, especially designed for the purpose. Samples of tested tile, as well as soil and water samples, were secured for chemical analysis. The tile removed for test were replaced with two other series of cement tile which were made for this purpose, and of which complete records of materials and methods were recorded. It is also planned to replace those tile removed for test during 1915 with additional cement tile manufactured by different methods.

The details of the investigation and the results of the first year's tests are published at this time, because of their economic value in demonstrating to those who are now using or considering the use of cement drain tile that special care should be observed to employ only the best materials and good workmanship in its fabrication, and if these precautions are not observed failure will result if the drain is located in some of the more concentrated alkali soils similar to those found at Grand Junction, Colo., and Garland, Wyo.

Drain tile manufactured in a manner as described for cement mixtures not leaner than one part cement to three parts of aggregate are apparently unaffected structurally when exposed for one year in operating drains in very concentrated alkali soils, similar to any of those included in the investigation.

Drain tile made from cement mixtures leaner than one part cement to three parts of aggregate should not be used in localities where the character of the alkali and concentration is similar to that found at the site of the experimental drains at Grand Junction, Colo., Montrose, Colo., and Garland, Wyo.

Drain tile manufactured in the manner described of one part cement to four parts of aggregate, the leanest mixture used, is apparently unaffected structurally by exposure for one year in an operating drain in concentrated alkali soils similar to those found at Fort Shaw, Mont., Sunnyside, Wash., Yuma, Ariz., and Roswell, N. Mex.

Other than the above, no very general conclusions should be drawn from this investigation until the results of further tests are obtained. It is anticipated that this report will be amended from time to time as the results are obtainable.

The bureau would be pleased to receive information concerning the behavior of concrete exposed to concentrated alkali soil which may come to the attention of engineers or others interested in the use of concrete under these conditions.

Concrete News in Brief.

Construction work is being pushed forward on the concrete trestle which the Southern Pacific Railroad Co. is building to overcome the difficulty of maintaining grades over the flats of the Sacramento river. The route is largely over made land and the constant dangers of sinking and overflow have resulted in the working out of a plan to carry the heavy traffic of the transcontinental lines over a trestle constructed on concrete piles driven to resistance. The track will be 15 feet above the surface of the ground. Eventually the greater portion of the distance between San Francisco Bay and Sacramento will be carried on trestles.

Jenkins & Wells of Sacramento, Cal., have been awarded a contract for the construction of three concrete bridges on the state highway lateral between Marysville and Wheatland for $14,216. The combined length of the three bridges is 400 feet.

The Fresno Glazed Cement Pipe Co. of Fresno, Cal., has been granted permission to sell 20,000 shares of its capital stock at par, to net the company not less than 90. Some 20,000 shares previously issued in exchange for manufacturing rights are required to be deposited as an escrow and withheld from sale pending the financing of the company.

G. M. Salsbury & Sons of San Fernando, Cal., has established a plant for the manufacture of cement pipe at that place.

J. F. Dowling of San Francisco has secured a contract for laying cement sidewalks in front of Golden Gate Park, San Francisco, on Fulton street from Fourteenth avenue to the Great highway at the rate of nine cents per square foot, or a total of $5,373.

The Chicago & Northwestern railroad has awarded the Barnett & Record Co. of Minneapolis the contract to erect the $500,000 concrete grain elevator which the road is preparing to build in Milwaukee. The work of driving piling for the big structure has been completed and the railroad company has applied for a permit to go ahead with the erection of the elevator. The plant, which will have a storage capacity of 2,500,000 bushels, will be equipped with the most modern machinery, including $40,000 worth of motors.

Milwaukee county has been allotted $172,186 as its share of the state aid fund for the construction of highways. The Wisconsin state highway commission has awarded 16 counties the full amount of appropriations to which they were entitled and the commission estimates that this year about $3,800,000 worth of highway construction, much of it concrete highways, and $500,000 worth of bridge construction will be done. The town pays one-third, the county one-third and the state one-third of the cost for the work done.

George R. Wade of Kenosha, Wis., has been awarded the contract for constructing a concrete road on the Geneva highway to the Pleasant Prairie line at about $13,000. The Independent Coal Co. will furnish the cement at $1.36 per barrel, delivered on the job.

The Stone & Webster Engineering Corporation of Boston, Mass., and the Dallas Union Terminal Co. will join in the construction of a concrete viaduct to connect Dallas and Oak Cliff. The plans for the proposed structure are now under consideration.

Gueydan, La., though a mighty little city, is spending thousands of dollars on concrete sidewalks. It is stated that a number of surrounding cities will soon start in since the impetus has been given. A contract for 10-foot sidewalks was let Sept. 8, and it is stated others are to follow.

"Concrete Roads," published by the Universal Portland Cement Co., contains interesting articles on the success of the concrete road and describes and illustrates in an attractive manner the way in which these roads enhance the beauty of the surrounding country and attract automobilists. Newspaper clippings are printed to show that in various parts of the country concrete roads are being specified where permanent construction is desired.

A large sewer of the latest approved concrete construction will be built at Owensboro, Ky., in the near future. The sewer will drain the district between Second and Fifth streets in the West end, and will cost approximately $12,000.

A plant for the making of concrete blocks is being erected at Hawesville, Ky. The construction of the plant and the making of the blocks are in the charge of Col. L. S. Powers.

LOUISVILLE CONCRETE NEWS.

Louisville, Ky., Sept. 18.—W. A. Thompson, grain dealer, is planning the construction of a grain elevator on Seventh street, near the Avery plant. It will be constructed of concrete and steel, and will embrace all modern ideas in elevator construction. Mr. Thompson's plans call for a plant with a capacity of 350,000 bushels, capable of handling 100,000 bushels daily. It will be 165 feet long, 63 feet wide, and 150 feet in height. The bins will be 65 feet high. The elevator will approach in size the plant of the Kentucky Public Elevator Co. and will cost $70,000.

Fire destroyed a small oil storage house at the plant of the Standard Concrete Block Co.'s plant near Twelfth and Oak streets recently. The loss was only about $100, for the flames were quickly suppressed.

Lewis A. Heitzman, general manager of the Standard Concrete Products Co., died at the Deaconess Hospital, following an operation for appendicitis. Mr. Heitzman was a native of Brownsboro, Ky., but entered the concrete business in Louisville six years ago.

CEMENT

Eastern Cement Market Strong.

New York, Sept. 18.—With $1.52 approaching nearer the uniform base price to dealers in wholesale quantities Portland cement manufacturers were not inclined to complain about business conditions this week. The report last week of the condition of the mills in the Lehigh district showing that shipments in this zone were 1 per cent greater during the eight months just closed than they were in the same period last year despite the slump in August, helped to show dealers that they might as well make up their minds that the day of cheap cement is passing, for the present at least. The stock on hand in twenty-five mills in the district on Aug. 31 was more than there was on hand on July 31, with one mill closed down. Buying so far this month, however, is rapidly depleting this stock, so that with about seven-tenths of all the cement sold at the recent cut prices already shipped, it will not be surprising if $1.52 base for this commodity will be general before long.

Banks have been inclined to make loans to cement mills, probably in anticipation of more European inquiries. The fact that New York during the month of August showed a gain in building projects of 36 per cent is sufficient to assume that dealers' stocks will move out fast and that in anticipation of continued active plan filing more cement will be needed when the base price is higher than it is now. These prospects make the cement situation stronger than it has been in many months.

RAIN RETARDS CEMENT SALES.

Cincinnati, Ohio, Sept. 18.—Guy W. Mallon, receiver of the Superior Portland Cement Co., reports an unusually large amount of material on hand at the end of August, on account of the unusually rainy weather experienced during July and August, for which months he has just filed his reports with the United States District Court. Whereas 40,000 barrels of cement on hand is about the normal quantity, Mr. Mallon says he now has on hand about 100,000 barrels, valued at $40,000, with a probability of increasing value.

Despite the unfavorable weather conditions referred to, however, Mr. Mallon reports sales for the year up to Sept. 1 as being 5,000 barrels ahead of the corresponding period of last year. Cash on hand Sept. 1 amounted to $8,228.77, being below normal on account of the amount of stock on hand usually represented by cash.

AUSTRIAN PLANTS FORCED TO CLOSE.

In Austria and especially in Galicia many of the largest cement plants have been practically ruined by the war. Many plants have had to cease operations. In the beginning of the war, before the Russian invasion in Galicia, there was a good demand for cement, apparently for fortifications, but this soon stopped. Although there has been a big drop in prices, Hungarian cement manufacturers are reported to have a good business; the only serious drawback is formed by the difficulty of getting workmen. It is generally expected, that after the war the demand for cement and concrete will be very strong, as houses, bridges, etc., which have been blown up or destroyed in some other way, will be rebuilt with concrete and cement.

CEMENT MARKET IN THE FAR EAST.

San Francisco, Sept. 18.—There has been a depression in the cement trade of the Far East, due chiefly to the general depression in all lines, though the situation in cement is hardly so bad as in many other trades.

For several years preceding the present war, the demand for Hongkong cement in the Philippines and other parts of the Far East had been falling off materially as a result of the competition from Japanese and Indo-Chinese concerns, and especially from competition with German manufacturers, whose product had been carried to various ports and to the South Seas and Australia at freight rates, which represented little more than the expense of ballast. With the outbreak of the war this supply of German cement was cut off, and it was expected that there would be a marked increase in the demand for the output of the Far Eastern factories. This demand has, on the whole, not been forthcoming, however, both because of general business depression and because of the high freight rates obtaining on all classes of goods and of the lack of tonnage in many cases at any price.

The demand for cement in Australia has continued in fair volume, and the Hongkong factory could find a ready market in that commonwealth at good prices if tonnage could be had. This needed tonnage is not, however, available at fair rates and the volume of business is restricted accordingly.

COSTA RICAN CEMENT IMPORTS.

Consul Chester Donaldson, of Port Limon, says the approximate amount of cement imported yearly into Costa Rica at that port is $100,000. Germany has furnished about 54 per cent of the annual supply; the United States about 35 per cent; Belgium, seven per cent; Great Britain and others, four per cent. This cement is sold here at about $3 per barrel, put up in wooden barrels or metal drums. The latter is the best packing for this climate, which has such penetrating dampness that a barrel of wood does not preserve the cement for more than a few weeks. Barrels of cement after a few weeks standing in these storehouses have hardened for nearly an inch on the inside of the barrel, which means a loss of nearly half the cement. Cloth bags are never used here. Germany and Belgium obtained a large share of this trade by putting up the cement in metal drums of the same size as the barrels.

The freight charges from Northern ports are $8 per ton; from Southern ports, $5 per ton. All freight is discharged at Port Limon direct from the steamer into the cars drawn up alongside, from which it is taken into the customhouse. There it is again placed on cars for the interior cities of Costa Rica, and for Port Limon is delivered in carts to the importer or merchant. Cement enters free of duty. The best packing for this climate is the metal drum of the same size as the barrel generally used, except a small difference made by the thinness of the metal. The only size seen in the market here, whether barrels or drums, is 400 pounds.

DESIRED 50,000 POUNDS IN MINIMUM CARS.

The Official Classification Committee, which meets this month in New York City, is considering a proposition to advance the minimum carload weight on Natural and Portland cement to 50,000 pounds.

Activities of Cement Plants.

The Lehigh Portland Cement Co., of Spokane and Metaline Falls, Wash., is now filling a 47,000-barrel cement order for the Federal government for various irrigation works.

Judge Densmore of the Superior Court of Riverside County, California, has decided against the Riverside Cement Co. in the first of four damage suits begun against the company in Riverside County by citrus fruit farmers, who claim damage to their orchards on account of cement dust from the company's plant. In the case of Robert N. Briston damages to the amount of $1,000 and an injunction were granted.

Preparations are under way for the reopening of the cement plant at Monolith, near Tehachapi, Cal.

The state of California is now one of the largest purchasers of cement in the state. Something over 100,000 barrels have been bought by the state for highway purposes this summer, the average cost being $1.70 per barrel.

Henry S. Gray, secretary and treasurer of J. B. Speed & Co., Louisville, Ky., reports that business is holding up very well. The company recently obtained attractive orders for all cement to be used in Louisville buildings.

The Universal Portland Cement Co. is making excellent headway in the erection of the large plant which it is building on the St. Louis river between Superior, Wis., and Duluth, Minn. Three of the larger buildings of the plant have been completed and two more are in course of construction. Operations will be rushed so that the plant will be ready for operation by April 1, 1916.

American exporters interested in the cement market of the Azores may secure from the Bureau of Foreign and Domestic Commerce at Washington or from any of the bureau's branch offices a copy of the analysis of the European cement referred to by Vice Consul J. W. White, jr., in Commerce Reports for April 30, 1915, page 507.

The Pacific Portland Cement Co., of San Francisco, has secured the contract for the Portland cement to be used by the California State Board of Harbor Commissioners during the coming year. The price named is $1.64 per barrel. Six hundred and forty-seven tons of Portland cement will be required for the reinforced concrete approaches to the Yolo basin causeway to be built by the state.

Actual operations at the new plant of the Southwestern Portland Cement Co., which is being located at Victorville, Cal., are expected to begin on June 1, 1916. The deposits have been investigated by E. W. Miller, formerly superintendent of the International Portland Cement Co., Spokane, Wash.; Phillip S. Taylor, formerly with the Riverside Portland Cement Co., Riverside, Cal., and H. A. Coffman, formerly chief chemist of the same corporation. Carl Leonardt, formerly a contractor of Los Angeles, will be in charge of the work. It is he who states that it will take about nine months in which to perfect a plant.

The Bonner Portland Cement Co., Kansas City, Mo., is furnishing the cement for several of the large contracts in the city. The Wessley hospital requires about 16,500 bags of cement, the Twenty-third street traffic way will require about 80,000 bags, and the Chambers building at Twelfth and Walnut streets will run about 28,000 bags. The plant at Bonner Spring, Kas., is operating day and night turning out the large orders that are now on hand.

Bahia Market for American Cement.

According to Consul Robert Frazer, Jr., of Bahia, Brazil, imports of cement at Bahia in 1912 were valued officially at $365,600, and were given by the local Chamber of Commerce for last year (1914) as 72,692 barrels. The size of the barrel is not noted, but that preferred here is of 180 kilos (397 pounds), and local dealers state that at least 90 per cent of the barrels imported are of that weight.

The cement was shipped to Bahia from the following ports: Hamburg, 22,866 barrels; London, 16,841;; New York, 16,650; Trieste, 6,650; Antwerp, 4,815; Fiume, 3,250; Bremen, 1,365; all other ports, 255; total, 72,692.

Uses of Cement.

Owing to the customary methods employed in the construction of private edifices in this district (brick, rubble, clay, and lime, plastered on the outside with lime and sand), little cement is used except on the ground floor, in outdoor steps, etc., so that the principal consumers of the product are the state and municipal governments in paving and other public works, and the Government and private companies in railway and port-works construction.

A good deal of cement was also distributed from here formerly to neighboring coast towns or those accessible by river, but comparatively little is now sent to the interior overland owing to the cost of transportation. One factory in Bahia manufacturing cement tiles and articles of reinforced concrete uses 300 to 500 barrels of 180 kilos per month.

The grades of German cement formerly sent here are said not to have been of the best quality manufactured in that country, but were sold cheaper than the American and English products. The English barrels are said to be generally superior to the American ones; they are lined with a heavier and stronger paper.

Recent Quotations.

A recent quotation for a well-known brand of English cement is $3.97 per 180-kilo barrel c. i. f., f. f. a. (cost, insurance, freight; free from alongside) Bahia, and on a leading American cement $4.30 per barrel under the same conditions. The English price is therefore 33 cents under the American, but this is compensated for by the Brazilian customs differential in favor of the United States.

The latest quotation on American cement received here by another dealer is $1.45 per barrel f. o. b. New York, which, with the value of the milreis at 25 cents, would work out to the merchant handling it in Bahia as follows:

Price in New York	$1.45
Freight ($14.80 per ton of 2,240 pounds)	2.62
Insurance (¾ of 1 per cent)	.03
Duty (20 per cent less than on cement from other countries)	.746
Handling, etc.	.375
Lighterage	.248
Cartage	.125
Storage (up to 3 months)	.25
Customhouse broker and petty expenses	.05
Total cost per barrel	$5.894

[The names of leading importers and dealers handling cement and of important contractors and consumers may be obtained from the Bureau of Foreign and Domestic Commerce or its branch offices. Previous reports on cement in Brazil were published in Commerce Reports for Apr. 16 and May 21, 1915.]

CEMENT MADE FROM SUGAR BEETS.

According to a recent dispatch it has been discovered in France that an excellent cement is one of the by-products of the manufacture of beet sugar. The scum that forms when the beets are boiled, and which has heretofore been thrown away, consists largely of carbonate of lime and water and from 70,000 tons of beets treated 4,000 tons of carbonate lime is obtained; to this 1,100 tons of clay is added, the resulting product being 3,162 tons of excellent cement.

CEMENT MANUFACTURERS AS ADVERTISERS.

An advertising company representing more than a dozen farm papers, having a combined circulation considerably in excess of a million, sends out a little pamphlet entitled "Standard Farm Paper Advertising," in which there is shown an illustration of farmers engaged in building sidewalks. Under the caption of "Intelligent Marketing" the publishers make the following statement:

The cement companies have been responsible for some of the most intelligent and effective promotional advertising during the past five years ever put over through the farm papers. They have used large space, splendid display, and sensible argument, and distributed splendid books on the subject. As a result, they have "put over" cement on the farm, and it will stay put over.

CEMENT INDUSTRY IN DALMATIA.

The war exercises a destroying influence on the cement industry in Dalmatia. Compared with last year the production has decreased 60 per cent, while a further decrease of 20 per cent is generally expected. This means considerable loss to the country, as the cement industry of Dalmatia is one of the greatest of Europe. There are several large cement plants, the largest of which is the cement factory "Dalmatia," with a capital of 4,500,000 krones ($900,000). A few other plants, which have become members of the Austria-Hungarian cement trust, have capitals up to 13,000,000 krones ($2,600,000). Building has practically come to a standstill and there is an absolute lack of labor.

Cement Market in Japan

In the Portland cement market there has been a plan for some time to increase prices, in view of the increased demand from overseas, coupled with the reviving of the domestic market. It appears from the latest report from Osaka that the plan has been carried into effect at last in the teeth of opposition from some quarters.

The report says that the millers' conference in Osaka decided to raise prices by 15 cents per barrel in all lines. The Japanese Advertiser, however, doubts whether the measure is well advised, considering that till recently the market was in deep depression and that the steady demand from overseas, on which millers seem to rely very much, has been occasioned by a temporary dislocation of the world market and is not thought to be permanent.

Gathering Flint Pebbles in France.

The collection of flint pebbles on the coast near Havre for foreign shipment, to be used in grinding operations, continued actively throughout the first half of 1914, and the shipments to foreign countries, including the United States, were maintained on the same scale as in the preceding year, most of the labor employed being women and children. While the work of collecting these pebbles has been continued since the war, there was a marked decrease in the exports from September to the end of the year. This decline in activity was one of the effects of the war.

Those engaged in the business at Havre express the belief that the requirements of Europe for plaster and cement for building materials for the reconstruction of entire towns will be so great that the United States will be called upon to furnish these materials. They feel sure that the mills of Europe will not be able to meet the demand. Consequently they anticipate an active demand for flint pebbles.

The valuation of the exports of flint pebbles to the United States increased from $39,503 in 1913 to $60,573 in 1914.

Cement Trade of Australia.

Whether the United States will be able to obtain a good proportion of the orders for Portland cement which Australia was accustomed to place in Europe before the outbreak of the war appears to depend entirely upon the rates of ocean freight from the United States as compared with those from England and Scandinavia, according to Commercial Attaché William C. Downs, of Melbourne.

The demand for cement by the federal and state governments for public works, and by private contractors for construction purposes, is constantly increasing, and it is apparent that the local production, although large, is not sufficient to satisfy it. Under present conditions it is difficult to make the local manufacture of cement keep pace with the demand, as the industry requires the investment of fairly large capital and the installation of special machinery which is difficult to obtain.

It is estimated by the Interstate Commission, which has just completed its investigation of the industry in Australia, that for the calendar year ending December 31, 1913—the last year for which full statistics are available—200,000 tons were produced in Australia, while 125,000 tons were imported. The average wholesale price per cask of 400 pounds was 12s. 6d. ($3.04) with duties paid, duties during that period being 9d. (18 cents) per 112 pounds for cement from the United Kingdom, and 1s. (24 cents) per 112 pounds for that from other countries. Imports were derived as follows, in tons: United Kingdom, 31,000; New Zealand, 2,700; Germany, Austria, and Belgium, 81,000; Scandinavia, 9,000; United States, 400.

The failure of the Australian factories to increase their output, the cutting off of shipments from Germany, Austria, and Belgium, which had furnished nearly 65 per cent of the total imports, and the difficulty of supplying the demand promptly from other sources, caused a scarcity of cement in Australia during the last half of 1914, and prices rose to a figure not wholly accounted for by the high ocean freights. Within the last few weeks as high as 22s. 6d. ($5.48) per cask has been reached, the present duties being 1s. (24 cents) from the United Kingdom and 1s. 6d. (36 cents) per 112 pounds from other countries. The placing of forward contracts in Scandinavia and Japan have, however, brought prices for future delivery down to from $4.38 to $4.87 per cask. Freights from Norway and Sweden are said to be from 35s. to 40s. ($8.52 to $9.73) per ton. At similar rates there is every reason to believe that American cement could readily be sold in this market at competitive prices.

As especially high grades of English cement are bringing even higher prices than those above mentioned, the American cement should be preferred to the Japanese, the quality of which has not been thoroughly tested in this market.

It may be noted that the Interstate Commission has concluded that, the local factories having a high natural protection in the form of heavy ocean freights, the duties might well be reduced to 6d. (12 cents) per 112 pounds on cement from the United Kingdom and to 1s. (24 cents) on that from other countries.

NEW INCORPORATIONS AND VENTURES.

Buffalo Potash & Cement Co., Manhattan, N. Y.; capital, $900,000; incorporators, W. E. White, J. D. Mooney, New York City, and Lee P. Burstine, Bronxville.

Mattamuskeet Cement Co., Swan Quarter, N. C.; capital, $25,000; incorporators, F. F. Spencer and others.

The Helderberg Cement Co., Hudson, N. Y.; increased capital stock from $600,000 to $1,000,000.

LIME

Agricultural Lime Regulations.

The new law enacted by the assembly of Pennsylvania to regulate the sale for agricultural purposes of crushed limestone, lime, gypsum, marl and related products by provision of the act, goes into effect on Jan. 1, 1916, at which time the producers and vendors of any of these products for agricultural purposes are required to secure a license from the secretary of agriculture. The fees for such licenses will be determined in proportion to the tonnage of such material sold in the commonwealth of Pennsylvania during the year previous to the applicaton for license. The mimimum fee is $5 and the maximum, $20.

The manufacturer or importer is required to label all packages where the goods are sold in packages, giving his name and address or that of the importer; and his place of business; and state the degree of fineness of the material; give the minimum percentages of available oxides of calcium and magnesium, together with the net weight of the contents of the package. Where the material is sold in bulk, the intelligence contained in the printed label or tag may be sent with the invoice or with the goods.

The act does not apply in any of its provisions to the sale of air-slacked lime, core or spent lime from gas houses or tanneries. None of the provisions apply to local sales of any of the lime products when delivered to the wagons of users at the point of its manufacturer, as they are presumed to be acquainted with the qualities of local products.

Failure to comply with the provisions of the act constitute misdemeanor with a penalty of $50 for the first offense and $100 for each subsequent offense. The department of agriculture is empowered to collect samples of any or all of the materials licensed to be sold under the provisions of the act to verify the statements of the producers upon their labels.

Traffic in agriculture lime, so regulated in Pennsylvania, will amount to a guarantee from the department of agriculture to the farmers that the products purchased under the licensed labels will be exactly what the goods are so represented to be.

Eastern Lime Demand Slows Up.

The general demand for lime for both building and agricultural purposes in the East is reported as being slow to fair. Reports to the Lime Service Bureau from various states are as follows:

Virginia.—The strong chemical demand in this district is keeping all plants busy. Agricultural demand is good, while building demand remains quiet. It cannot be considered, therefore, that conditions in the Virginia district are generally good, but it matters not to what trade or consumption the product goes, chemical demand is causing heavy kiln operations at the present and a continued steadiness to the agricultural and building lime markets at the same time.

West Virginia.—Conditions are generally good in the West Virginia district.

Maryland.—Nearly full kiln operation is advised by Maryland plants reporting, indicating the usual good fall agricultural output.

Pennsylvania.—A brisk agricultural season prevails in the Pennsylvania district, kiln operation at most plants being heavy. A manufacturer advises, in speaking of the present state of demand, "While shipments are continuing at a rapid rate, as has been heretofore reported, orders are not coming in so rapidly and indications are that the fall rush is slackening." Building demand in New York is still somewhat affected by the plasterers' strike.

New England.—Output shows improvement in the New England district and general conditions of trade are reported as good. Twenty-eight of 34 kilns in Western Massachusetts are running. This indicates about 85 per cent of possible capacity.

Activities of Lime Manufacturers.

T. E. Smith of New Castle, Pa., and Sterrett Smith of Mercer, Pa., have bought the plant of the Climax Lime & Stone Co. which is located at Wick Station on the Bessemer & Lake Erie railroad, Pittsburgh, Pa. Included in the purchase were 10 lime kilns, a steam shovel, drilling machinery, cars and other equipment listed and 65 acres of limestone and the purchase of 30 acres of land. The Smith brothers will build a big warehouse on the property at once.

The National Mortar & Supply Co., Pittsburgh, Pa., reports that the buying of agricultural lime is much heavier than usual. Their plant at Gibsonburg, Ohio, is very busy manufacturing this product.

The import of lime and limestone into Holland during the year 1914 amounted to $313,600. Of this quantity Germany delivered to the value of $103,120. Unslaked lime was imported in large quantities, amounting to $1,484,000, of which Germany supplied $213,200.

BIG QUARRIES CONSOLIDATION RUMORED.

New York, Sept. 18.—Out of the mere fact that the New York Trap Rock Co. has purchased a number of thousands of cubic yards of crushed stone from the New Haven Trap Rock Co., whose local agent here is W. Scott Eames, formerly public works commissioner of New Haven, Conn., there has been woven a wonderful rumor of a large combination of crushed stone plants in this city that would get together for the purpose of bringing the price of this commodity further within a profit-taking range.

The New Haven company, which has a plant just outside of Branford, a suburb eight miles north of the Elm city, came into this market about a year ago with the avowed intention of getting some of the business away from those concerns that had been here for years. All sorts of prices for crushed stone have resulted since then, until recently when the public service commission called for bids for subway work the range of prices ran from 60 cents to 90 cents. The commission readvertised for bids after throwing all the first ones out and on Sept. 11 announced the figures as follows:

Portion A—About 243,000 cubic yards, either trap rock or hard lime stone:
- Upper Hudson Stone Co. $228,010
- Haverstraw Crushed Stone Co. 250,240

Portion B—About 32,500 cubic yards of three-inch ballast, either trap rock or field stone:
- Haverstraw Crushed Stone Co. $26,325
- Upper Hudson Stone Co. 27,625

Immediately following the announcement of the receipt of new figures, there was talk of bringing the two companies together. The fact that M. D. Wandell, the New York representative of the New York Trap Rock Co., and W. Scott Eames, representative of the New Haven company, had been seen together at luncheon heightened the rumors of the deal and the trade began to accept it as a settled fact.

The development of tremendous markets in New Haven and vicinity, as well as in points along the Long Island Sound shore, has been crowding the capacity of the million-dollar New Haven plant. In the meantime an almost unprecedented demand for crushed stone in New York has put the New York quarries to their resources to meet the demand and so outside purchases have been made.

The result is that prices for this commodity are very much higher than they have been and price cutting has not been resorted to, mainly because the market has been so strong that no one could afford to cut and still make deliveries and a profit. Where prices ranged around 75 to 85 cents a few weeks ago, they are now quoted between 85 and 90 cents and crushed stone is hard to get.

Looks for Active Season.

M. D. Wandell, New York representative of the New York Trap Rock Co., stated this week that he looked for a very active season for his product this winter and next year. He said:

We have been passing through a vast period of retrenchment. In the meantime new subway systems are reaching out into territories that are not now densely populated. Curbing and pavements will be laid out over fields that are now under cultivation. All the roads leading into New York are in bad repair, owing to state, county and municipal retrenchment, and these simply have to be fixed before long. The railroads will have to reballast because of the general introduction of the heavier steel cars and consequent heavier locomotives.

Our prices have gone up recently, despite this falling off in market. If this extra demand comes and the subway requirements keep up, as there is every expectation that they will, it seems to me that we will be entering upon a remarkably prosperous year.

This company has recently been spending large sums in the further development of its Hudson river quarries along the Palisades and in the construction of new stone barges. It has asked $10,000,000 for its plant should the state desire to take it over in connection with its plan to protect the Palisades from defacement, but the matter has been dragging out for a long time and in the interim the company is going right ahead increasing its equipment to meet the new requirements of this market.

This is about the only available source of real trap rock near New York and there is some concern as to where the market will be supplied from should the state take over this plant.

FARMERS TOLD HOW TO USE LIMESTONE.

As an encouragement to the farmers in Rutherford County, Tenn., and in furtherance of its efforts to induce more farmers to raise alfalfa, the industrial department of the Nashville, Chattanooga and St. Louis railway, aided by a soil expert from the University of Tennessee, held a public day recently, when the farmers were shown how to use ground limestone as a fertilizer. Lime clubs will be organized and crushed limestone will be furnished free to a limited number of farmers who agree to use it on land to be planted in alfalfa. The usual amount of free crushed limestone is four tons, sufficient to prepare one acre. The method has been followed with gratifying results in West Tennessee, where five lime clubs in five counties have been organized, and free crushed limestone has been given to 125 farmers. At the demonstration, limestone was crushed, the ground was treated, and alfalfa was planted, so that the farmers might see the method to be followed. Every step was explained by experts.

SAND-LIME BRICK

Sand Lime Brick in Europe

By E. R. SUTCLIFFE,
Leigh, Lancs, England.

The sand-lime brick industry in Europe has progressed satisfactorily in recent years, in Germany and France the progress being most marked. In France the number of works has increased about six times since 1906.

My connection with the industry dates back to 1894, when I made my first design for a sand-lime brick rotary table press, since when I have kept in close touch with its progress. The industry in those days was confined to Germany, where for years it was retarded by different inventors claiming to hold process monopolies under patents. Between the years 1896 to 1900 the major portion of the machinery and presses for the German works were imported from England, so that whilst the industry was German in its inception, still much of the pioneer work was initiated in Great Britain.

The development of the industry in Europe up to the year 1906 was considerable, it being then computed that 268 works were in operation or being erected, with a production of about 1,000,000,000 bricks per annum. Owing to the war I am not able to get accurate information as to the present position, but by the end of 1913 I compute the works in the different European countries to be as follows:

	Works.	Annual production about
Germany	311	1,555,000,000
France	43	150,000,000
Holland	15	75,000,000
Great Britain and Ireland	9	15,000,000
Sweden	9	24,000,000
Denmark	7	18,000,000
Russia	5	10,000,000
Switzerland	4	8,000,000
Austria	4	8,000,000
Spain	4	10,000,000
Norway	3	6,000,000
Belgium	3	6,000,000
Portugal	2	5,000,000
	419	1,890,000,000

In comparing these figures with the development of the industry in the United States or Canada, the dimensions of the bricks made in the various countries should be taken into account. The American or Canadian brick of 8¼x4x2 inches has a content of 66 cubic inches, whereas the German brick is of a size 9¾x4¾x2½ inches, or a content of 115.75 cubic inches, and an Austrian brick measures 11½x5½x2½ inches, or 158 cubic inches. The English and French bricks are also larger than the American size, so that we may say that the bricks in bulk would be equal to 3,000,000,000 American or Canadian bricks.

In Germany the majority of lime-sand bricks made are common bricks, and I would estimate the average selling price of the bricks at the works at 21 marks or, say, $5.10 per thousand, and the "all in" cost of manufacture at 16 marks or, say, $3.90 per thousand. Hence the total value of the German trade in these bricks reaches a round figure of about $8,000,000, with a profit of $1,800,000. From my knowledge of the substantial way in which their plants are generally laid out, I would put the capital value of the industry at 50,000,000 marks, or round about $12,500,000. I have made out figures in this way with a view to more clearly showing the importance of the industry on this side.

The methods employed in Germany for their manufacture are various, but the three following are the principal systems adopted. Given suitable local conditions, I would put them all on an equality as regards efficiency and quality of output.

Charge Mixer Process.

This process consists in mixing the materials in a batch of 500 to even 4,000 bricks at one mixing. The fresh quicklime is ground down to a mesh of about 30x30 per lineal inch, then fed along with an equal quantity of sand (or in some cases even double or triple the quantity of sand) into the mixer, at the same time adding the necessary quantity of water for the hydration of the lime. This preliminary charge is then mixed for a period ranging from 20 to 30 minutes, during which time the lime becomes slaked. The remaining bulk of the sand to bring the proportions of the mixture to 6 per cent, 7 per cent or 8 per cent of lime, as the case may be, is then added, and a further mixing for a period of about 10 minutes completes the operation, after which the material is ready for pressing.

Sometimes these mixers are steam heated, with steam jackets; in other cases a certain amount of steam is blown into the mixer during the mixing operation, but as naturally owing to the slaking of the lime the mixer becomes very hot, there is no necessity for steam heating, or even for blowing steam into it. In some cases the mixer is tightly sealed up so that a certain amount of pressure will rise in the mixer during the operation caused by the steam generated in slaking the lime. In other cases no attempt at sealing up the drum is attempted. I have seen cases where steam jacketed mixers have been used, and where in time the interior lining of the drum has been worn through so that the mixer could not stand the pressure, and then the mixing has gone on without the use of pressure or steam, simply the heat generated in slaking the lime being sufficient to hasten the reaction. Some of these mixers will range in dimensions capable of mixing a charge of 12 or 13 cubic yards.

As a rule the prepared material, on being discharged from the mixer, is allowed to fall into large storage hoppers with automatic feeders which regulate the discharge to the various presses. Sometimes edge runner mixing mills are used for the final preparation of the material after passing through the mixer.

The measuring of the sand and lime in the required quantities is occasionally effected by weight, but more generally by using measuring hoppers. In other cases where large mixers are used, so many wagon loads of sand will constitute the respective charges along with a hopper of lime. As the mixing is invariably effected on the upper floor of the building, lifts are frequently used for taking the sand to the top story.

The ordinary method of grinding the lime is to use an ordinary Ball mill.

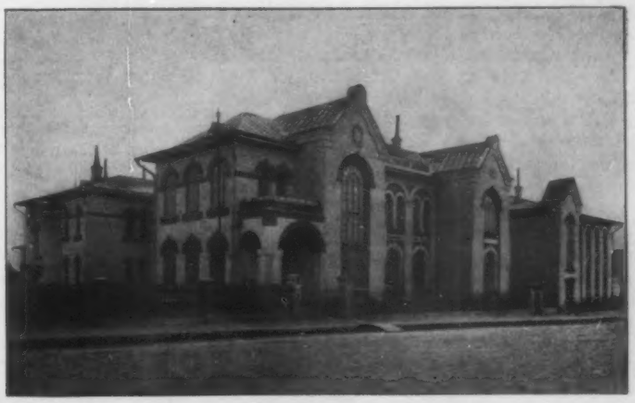
Hydrated Lime Process.

In this process the lime is hydrated before mixing with the sand, and perhaps the most usual method for hydrating the lime is in large slaking drums or trommels, which consist of drums about 4 feet or 5 feet in diameter and 12 feet to 15 feet in length, revolving on end trunnions with suitable charging ports in the drum. Into this the lime is fed along with the required quantity of water for hydrating it. The drum is then set revolving slowly for a period of time required for effecting the hydration, which will range from half an hour to one hour, after which the lime is discharged into suitable receiving hoppers to be later screened or in some cases passed through a disintegrator.

The final mixing of the material with the sand is then effected through a series of suitable measuring apparatus for measuring the required proportions of sand and lime, the final mixing invariably being done in edge runner mixing mills.

It is found generally that it is advisable to allow the lime to stand for one or two days before being drawn upon for mixing up with the sand, as this allows the lime to be more certainly slaked. In some cases with these slaking drums a portion of the sand is added with the rough lime in the drums.

Whilst not now generally adopted, a system in use which gives fairly good results, and which is simple, is to simply charge up the lime in side or



RUSSIAN OFFICE BUILDING AND HOSPITAL, RESPECTIVELY, BUILT OF SAND-LIME BRICK.

end tip wagons, and to pour into these wagons the measured quantity of water which experience has shown is required for the hydration of the lime, then to run the wagons into the hardening chambers during the daytime where they can be kept warm. This lime is then afterwards screened and mixed up with the sand. This system really comes from one of the first methods used, which was to have small wagons fitting beneath the lime-sand brick cars in which the lime was steamed and slaked at the same time as the bricks were hardened, and such methods are still in use in a number of cases.

Silo System.

In this system the quick-lime is ground in its fresh state to a mesh of about 30x30 per lineal inch, after which it is measured in the required proportions with the sand, then mixed in paddle mixers, where the necessary quantity of water is added for hydrating the lime. The material is then allowed to fall into large silos or bins, where it is permitted to rest for a period ranging from five hours up to twenty-four hours, after which the material is drawn upon for the final mixing with additional water if necessary and passed on to the presses.

The silos or bins into which this material is put are usually arranged in such a way that whilst one bin is being charged the other can be drawn upon for use in the plant. The most general type of silos used are those consisting of cylindrical drums made of steel with an automatic discharge apparatus at the base of the bin. The paddle mixer for mixing the materials is placed on an upper staging erected over the top of these silos so that the mixed material can gravitate into one or the other.

Ordinary paddle mixers are used for the final mixing of the material prior to its coming to the press and in some cases edge runner mixing mills are used for this final mixing.

In a representative plant the silos will be 15 feet in diameter and about 35 feet in height.

The largest lime-sand brick works in the world, viz., that of R. Gutman, near Berlin, operates on the silo system as above described. This plant when in full operation has an output of 500,000 bricks per day. It is a wonderfully well organized works.

Some of the German brick works are fitted up with small electric locomotives for hauling the wagons of bricks into and out of the hardening chambers and to the stacking ground. A feature which I have seen in use in the larger works is to collect a whole train load of cars sufficient to fill a chamber on to one transfer car, which is then propelled in front of the hardening chambers and the whole train load run en bloc.

Such a method where plants are run night and day and the hardening chambers are kept in constant operation, results in economy and permits the chambers being used to the fullest extent.

The great strides made in this industry in Germany are due largely to the early recognition that the ordinary machinery as used for making clay bricks was unsuitable for making lime-sand bricks, and the consequent provision of strong, massive machinery suitable for the heavy duty demanded. Then also it was early recognized that the industry would be stunted if the manufacturer aimed at supplying the facing brick trade only. The prejudice against the bricks, which was strong at first, was overcome, with the result that they are accepted quite as freely as burnt bricks.

In France much artistic taste has been shown in using these bricks. The color seems to please the French taste, and the refined effects they obtain with the use of these bricks are most pleasing. They are thus largely used for facing purposes and their selling price is much higher than in Germany; on the other hand, their manufacturing costs are greater. The two photos show two lime-sand brick buildings at St. Addresse, near Havre, in France, which, whilst showing the refined French taste in using their bricks, possess interest at the moment as being placed by the French Government at the disposal of the Belgian Government. The building in Place Frederic Sauvage is used by the Belgian Ministers of State as temporary offices—the building is in a series of flats with shops underneath. The Villa Hollandaise is being used as the official home of the Belgian foreign minister.

The method of manufacture in France is chiefly on the slaked lime process. The French lime is principally obtained from soft, but very pure limestone, and slakes readily to an extremely fine powder. The hydrated lime industry has developed to an important industry and consequently suitably hydrated lime is readily obtainable, and many lime-sand plants obtain their lime ready hydrated from the lime works. In most works edge runner mixing mills are used for the preparation of the materials. The tendency has been to install light machinery, but it is gradually being realized by makers that more robust machinery is required. In France the lime-sand brick has come to stay and there is no fear but that the industry will develop rapidly, and I look for great developments in the industry as soon as the present European war is ended.

In Great Britain the progress of the industry is slow, in part due to the continued depression of the building trades, caused in a great measure by new acts of legislation. There is a scarcity of housing accommodation, but the returns on capital invested in cottage and house property are too low to tempt private enterprise; but this is a state of affairs which promises to right itself in the near future. A reason for the slow progress is also to be traced to the fact that we have in all parts of the country excellent shales and clays for brick making. In the north the quality of the clay and shale bricks is particularly good, being made almost exclusively on the stiff plastic and plastic process, and to compare with such bricks in quality a high-grade lime-sand brick is required, necessitating the use of tube mills or other grinders.

Then, again, common shale and clay bricks of about double the cubic dimensions of an American brick are sold at $5 to $6 per thousand, so that the opening for lime-sand bricks is limited to particular areas and for use as facing bricks. At the same time high-class quality lime-sand bricks could be made under English conditions, to sell at even this low price, with fair profits, but for the development of a new industry where some prejudice has to be overcome higher returns are looked for. We have also suffered from the unscrupulous company promoter, and a number of plants have in the past been installed which were doomed to failure from the commencement, their only object being to fill the purse of some individual with a "process" for sale. In one case a plant was installed in which the sand had to be carted to the works at a cost of about $6 to $7 per thousand bricks. In another case a pinch of snuff or something equally beneficial was mixed in with the mixture and in this case the layout of the machinery gave the impression that it had been erected where the lorryman thought it most convenient to unload his lorries.

In London and the south of England there are good openings for these bricks; sand is plentiful and clay bricks expensive. One plant in the London district—that of Mr. Jesse Clack at Croydon—is doing extremely well.

In Holland the lime-sand brick has taken a firm position. Compared with its population the industry has progressed there equal to what has taken place in Germany, the type of plant and the methods adopted being similar to those employed in Germany.

Altogether I consider the European progress as satisfactory. Apart from lime-sand bricks, on similar processes immense quantities of bricks are made from blast furnace slag, whilst in France clinker obtained from the burning of town refuse and from boiler ashes is utilized largely for brick making, the method employed for such manufacture being analogous to that used in lime-sand brick manufacture.

ACME COMPANY PROSPERS.

As an example of sand-lime brick prosperity, the Acme Brick & Sand Co., Milwaukee, Wis., recently stated: "Referring to our sales, we are now, at the end of August, over 1,000,000 brick ahead of our sales for the entire last year and at the present time are selling our product as fast as it is made, with enough orders and prospects for a long run."

New Orleans Plant Will Open Soon.

James H. Dyett, president of the New Orleans Silica Brick Co., a new concern in the Crescent City, which will manufacture bricks from the sand of Lake Ponchartrain, on his return from the East Sept. 8 announced that the plant will be in operation by Dec. 15.

The company will employ 100 men when operations are begun. It will operate a fleet of barges and towboats, which will bring the sand from the bottom of the lake, and by a piping system the sand will be transshipped to the factory.

Mr. Dyett, in an interview with a ROCK PRODUCTS AND BUILDING MATERIALS correspondent, declared that his trip East had convinced him that the period of depression is over, and that manufacturers and building material men he had met all expressed the same opinion. He is a booster for his home town, and says he received many inquiries as to the desirability of New Orleans as a manufacturing center. Of course, he told them all about it.

Manufacturers' Books and Pamphlets.

Under the title "The Complete Line of Best Products," the Trussed-Concrete Steel Co. has published a compact and intensely interesting pamphlet of 12 pages briefly describing and illustrating various products manufactured by this concern at its Youngstown plant. Its pages are printed for the purpose of giving in concise form a description of the uses to which "Hy-rib" rib lath, diamond lath, pressed steel studs, corner beads, and base screeds for roofs, sidings, partitions, ceilings, interior and exterior plastering, stucco, etc. All of these materials are completely illustrated and described in larger books which the company furnishes upon request.

The Osgood Co., of Marion, Ohio, is using pictures to good effect in a six-page folder sent to the trade in order to better acquaint them with the various types of excavating machinery manufactured by this firm. The only descriptive matter of the Osgood line of steam shovels and dipper dredges presented is given in conjunction with the various illustrations in one or two line captions which are used to explain the various operations. A number of illustrations are shown with shovels operating in quarries, sand and gravel banks, and dredges on several of the largest rivers in the country. As a whole the folder is exceptionally interesting and will no doubt be received with pleasure by the trade.

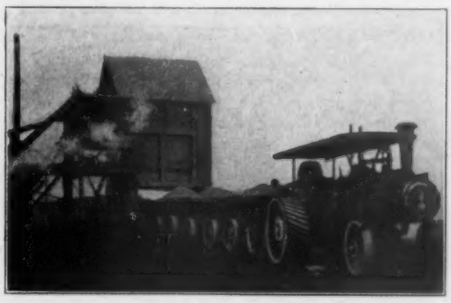
An eight-page booklet dealing with the use of concrete septic tanks for farm houses and dwellings in small towns has been published by the Universal Portland Cement Co. and is being distributed from the Chicago office.

Goetz Bros., sand dealers of New Albany, Ind., have filed complaint with the Interstate Commerce Commission against the Pennsylvania & Elgin, Joliet and Eastern railroads, complaining on rates of sand from Pennsylvania points to Indiana points. An order fixing reasonable rates is asked; also reparation in the sum of $57.18.

With the QUARRIES

Modern Solution of the Hauling Problem

Alexander of Macedonia, conqueror of Persia, and incidentally "master of the world" as known to the Greeks of his period, was the greatest lover of the horse that ever lived. He rode the most famous steed of history, and by his orders the wonderful hippodrome in his monumental city of Alexandria



TROY TRAIN IN WASHINGTON COUNTY, IND.

in Egypt was built. His statisticians with all previous records and literature at their command as accumulated in the great library there estimated the horse as being the most wonderful and valuable servant of man, for forty per cent of all the work then accomplished by civilization in any way was attributable to the use of the horse in some application of his strength and endurance. At that time the camel as a burden carrier was the principal rival of the horse and amounted to nearly half as much in importance. By this we learn that the transportation problem was well recognized in such early times and calculated to amount to sixty per cent of the total cost of all work and material improvement in parallel proportion as it exists today. Later in the Roman period the work of the horse moved up to fifty per cent of all the work of civilization; the labor of the hands of men with such tools and machinery as were available being counted as the other half of the sum total. This even balance was practically maintained with occasional slight variations up to the time of the Philadelphia Centennial in 1876, when there was a very pronounced and universal introduction of farm machinery and a tremendous increase in the application of steam as a motive power, substituting for the horse.

In the more recent years the invention of electric and gasoline motors have substituted further until the usefulness of the horse has probably declined again to the 40 per cent line as it was in the time of the Grecian supremacy, possibly a little below that percentage now.

The value and price of the horse has been maintained through all periods of substitution and displacement since 1876 because the hauling tonnage of civilization has increased more rapidly than the mechanical improvements have become available. The present selling price of a good team of draft horses at the centers of population in this and all other countries is just as high as it was in 1810, before the steam engine had been applied to drive a boat through the water or to draw a train of loaded cars over a railroad.

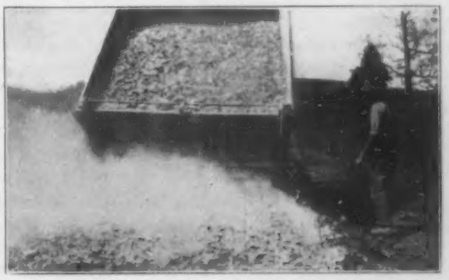
Indeed, the average price of a good team of horses, able to draw a substantial wagon having a yard and a half box with its driver, has steadily advanced until it is just double what it was in 1810. The contractors of the Capitol at Washington in 1810, paid $2.50 per twelve hour day for such an outfit. In the Chestnut Street Theatre in Philadelphia in 1820, $2.50 was paid for a ten hour day. In the construction of the Bunker Hill Monument at Boston in 1830, the price was $2.25 for a ten hour day. On the United States Mint in New Orleans in 1840, with a negro slave driver, $2.25 was the price paid for a twelve hour day. On the Tennessee Capitol at Nashville in 1850, $2.50 was the price for a ten hour day. The addition to the Court House in St. Louis, built in 1860, $2.75 was paid for a ten hour day. At the Cincinnati Post Office in 1870, $3.00 was paid for teams for a ten hour day. The prevailing price of teams in the reconstruction of Chicago in 1872, was $4.00 for a ten hour day. The price in all of the principal cities at the present time with the same kind of team averages $8.00 for an eight hour day, and in the smaller cities and rural districts the universal average price is $5.00 per day—exactly double the average price in 1810.

Any contemplation of the improvements right under the daily observation of every active business man apparently rolls up a stupendous total to be credited to the efficiency of the horse. Yet his real efficiency is very low indeed when the facts are all brought out and fully considered, and we soon learn that the use of horse power is a most expensive luxury. His first cost, and the cost of up-keep are far out of proportion when compared with the fuel and up-keep cost of an ordinary slide-valve steam engine, and the resultant development of power is as five to one in favor of the steam engine computed with reference to the cost dollar. Laying aside the envelope of sentiment, reverence and even affection with which we usually

RESULT OF MOTOR TRUCK SPREAD.

surrounded the horse and his performances in past ages, the application of cold principles of modern engineering tells us in plain dollars and cents just how efficient is the horse, or rather, just how inefficient he has always been.

A good work horse will weigh 1,100 to 1,600 pounds and sell for $275.00 to $350.00, or rather he is rated as being worth so much to the man who owns him—usually such a horse is not for sale. Figure $120.00 per annum to pay for the feed of such a horse; $30.00 more will have to be spent for his shoes and other incidentals; while the stable cost with all the incidentals attached thereto will easily amount to another $50.00 where there are a large number of horses kept in the same barn. The last item will be much larger if there is only one team being stabled or any less than 10 head of horses. Speaking in round values the cost of having a horse on any given job through one working

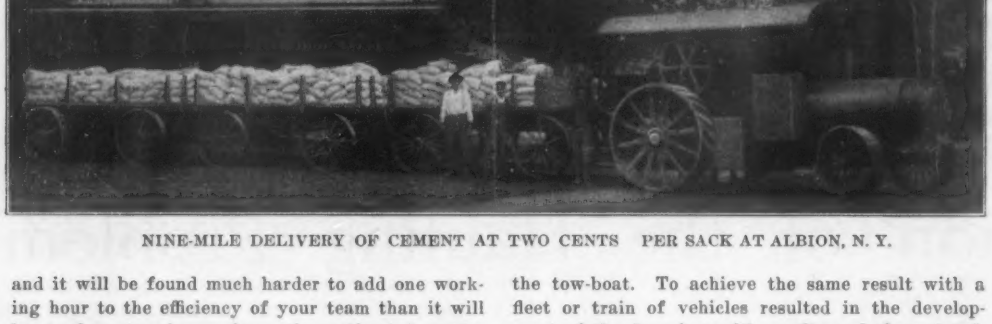


PACKARD MOTOR TRUCK SPREADING BASE COURSE

season will just about amount to the value of the horse.

If you pay $250.00 for the horse and $250.00 each year that you use him until the 10 years of his estimated usefulness has expired, you will have paid just $2,750 for the ten years' work of one horse. This rapidly runs up into big money and the question arises, what can the user of this horse secure for so much money?

Take a team of horses having the combined weight of 3,000 pounds, and that would indeed be a very good team. It ought to be good for a steady ten hour day's work, drawing 750 pounds at the pole, upon a level hard road, or a maximum load in the box of a properly constructed wagon of 6,000 pounds. Since no roads are level but up and down grade, the actual practical results will have to be reduced to 3,000 pounds. This figure will also take care of the hard pulls in bad stretches of road such as are encountered in the average working conditions, and three miles per hour is the maximum safe rate of speed. At the end of the year your team will have put in 1,000 actual working hours, or just about 100 ten hour working days. Now, when all of the factors, including the pay of the driver, have been worked together for a result you will inevitably reach the conclusion that the cost of the ton mile will arrive at 25 to 30 cents, provided all of the conditions are fully up to the average of expectation and that the weather record of the season shows a seasonably good distribution of rainfall and fair weather. Indeed, 25 to 30 cents per ton mile is not a safe basing figure unless the conditions surrounding your operation represent a very good average. A long wet spell in the middle of the summer with subsequent muddy period of several weeks will throw the cost of your ton mile up to 35 or 37 cents. A strike amongst the laborers for a few weeks or shortage of cars on which the initial delivery depends will pop your ton mile up to the cost of 40 to 45 cents with merciless certainty and without any hesitation, for your teams will be fed three times a day whether they are standing or whether they are working, and the cost of all standing time must be figured against the working hours. Every hour less than the 1,000 hour estimated to be worked will increase the cost,



NINE-MILE DELIVERY OF CEMENT AT TWO CENTS PER SACK AT ALBION, N. Y.

and it will be found much harder to add one working hour to the efficiency of your team than it will be to lose ten hours from the estimated quota. The best results then to be expected from a very good team with a reliable driver who is always prompt and contented will be found to be 25 to 30 cents per ton mile and it is much safer to figure a cost of 35 to 40 cents in all cases where the full control of the men and the initial delivery are out of the hands of the contractor who pays the bills, no matter whether it is a road job or any other undertaking where a large amount of tonnage must be delivered regularly beside the job. Such figures will not be found to provide for superintendence, profit or overhead, which must come in as a part of their proper department in figuring the whole transaction.

One of the most valuable features of railroad practice that has come generally to the knowledge of traction engineers and those interested in the important matter of transportation, is the properties of the draw-bar pull. Tests and statistics applying to road work have proved that the draw-bar pull required to move a rolling ton varies from 50 pounds upon a perfectly level and uniformly surfaced pavement to 150 pounds over a first-class hard road, and when the practical conditions of the average well built road is taken into consideration with its up-grades and down-grades, good curves and bad corners, steep bridge approaches and soft spots, a draw-bar pull of 250 pounds must be assumed as the cost factor in hauling computations such as we are interested in, when it comes to the matter of delivering crushed rock, rubble, gravel, sand, cement, lime, conduit pipe sections, bridge iron or any other material commonly used in the construction of roads and the equipment of the same.

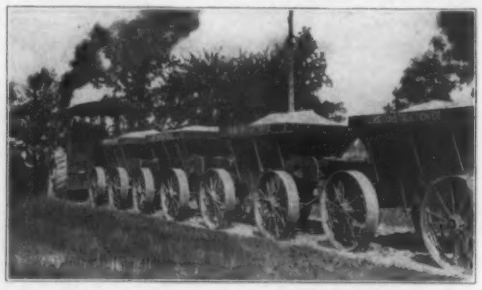
The early railroad cars could only make a few miles per day at very low speed and were continually making trouble with very high repair bills. The development of the draw-bar, more than any other feature of car building, eliminated the major part of the trouble in the rolling stock department of the railroads. Applications of this principle has made possible the perfection of the road tractor, as well as the caterpillar tractor, whose efficiency has been made practical under the concentrated development of American equipment builders by means of trailers all connected by means of draw-bars into a train so that the tractor train runs upon the average country road in much the same manner and sometimes at speed equal to the railroad with its steel rail track. Caterpillar tractors supplied with trailers, having extra wide tires, proceed over virgin turf or even plowed fields the same as if it were upon a road, being steered the same as a boat upon the water at the will of the operator at the helm.

It may be interesting here to note that the principle of the draw-bar was first observed by examining the behavior of a fleet of boats in the Erie canal. The fleet consisted of a tow-boat propelled by steam and hauled a number of barges trailing after it, the first connected to the tow-boat by means of a hawser. The second barge having its hawser attached to the first, the third to the second, etc. It was found that when the tow-boat "drew" around a curve with the hausers all taut that the barges followed around the curve exactly in the wake of the tow-boat. To achieve the same result with a fleet or train of vehicles resulted in the development of the draw-bar with results as before stated.

It is now a matter of common knowledge that the use of horse-drawn wagons is only economical on work of small proportions as to cost, volume, time and distance. The motor truck has recently come into the field of reducing the cost of the ton mile, steam and the caterpillar traction engines designed for the same purpose, each with a field of its own, have, since their introduction succeeded in reducing the cost of the ton mile in road work particularly to les sthan 15 cents as a general proposition. There are indeed a very large number of instances where the astonishing results of five and even four cents per ton mile have been actually delivered in practice upon a very large tonnage, where the going was by no means superior and where nothing better than ordinary labor was employed for working the job.

The road contractors this season have been and are confronted with a condition never before encountered in the matter of securing teams to move the tonnage necessary to complete their contracts. Horses have been scarcer and higher in price, so that the farmers have demanded a higher figure for their teams where they were willing to let them out for any portion of the season, so that the pressing necessity of turning to the economy of mechanical transportation has never been so insistent as at the present time.

Owing to the unusual distribution of rainfall in all parts of this country in 1915, the farmer has been delayed as well as the road contractor, so that from this time forward until the close of the season there will not be available anything more than the merest transient accommodation at very high prices from the direction of local teams. It



KALAMAZOO CONTRACTOR'S OUTFIT.

is safe to say that the cost per ton mile by teams in very many places is going to be above 40 cents. This condition has already been discounted by many of the best informed road engineers and contractors who have provided themselves with tractor or motor truck equipment and they are reaping the benefits right now of the economies to be secured by the intelligent application of scientific achievements in the matter of equipment provided for this very emergency.

What now may seem to be emergency conditions will never change. There is no future time coming when teams for big work will be more plentiful than they are now, or when the improvements in dump-wagons, tractors, motor trucks and trailers will be any less indispensable than they are at the present time. There is no way left open by which the big road contracts now under construction can be brought to completion this season without mechanically driven transportation facilities.

The contractors and engineers in charge of highways and municipal improvements not already supplied with this kind of equipment can better afford right now to take a week off and attend to the matter of promptly supplying this deficiency. Otherwise their balance sheets are sure to demonstrate disappointment by the time snow begins flying to drive the operations into winter quarters. Railroad deliveries this season have been exceptionally good all things considered, for there has been no serious shortage of cars, but there has been a shortage of labor and a shortage of teams to transport the material. The delivery of the road tonnage itself, the heavy material for concrete bridges, culverts and retaining walls, steel bridges, etc., has been the main drawback.

Mechanical transportation equipment dispenses with more than half of the labor formerly connected with the transportation feature and allows such an additional number of men to be added to the force that must be devoted to operating the concrete mixers, spreading and rolling of road surface and grading and ditching. Some engineers estimate the number of men dispensed with by the introduction of mechanical transportation of road material just about offsets the shortage of labor which is occasioned by the large crops and the very perceptible exodus of reservists who have gone to join the foreign armies.

A few interesting practical results may be cited for the benefit of those who can appreciate the full meaning of the present situation which is certain later on to be recognized as the permanent condition of the future of the road building business in this country.

The first improvement known to have been introduced in the way of road equipment could be dated about 1835. It was in connection with the construction of the National Road in Eastern Ohio when a farmer by the name of Zane, who had been employed to haul a number of loads of sand from his pit to be used in the surfacing or top dressing of the road devised a collapsible bottom consisting of neatly matched rails so that the load could be dumped out of the wagon by loosening an iron pin penetrating the ends of the rails and so allowing him to shake them separately in such a way as to make a cataract of material over the running gear of the wagon. Being thus relieved of the load the team would be advanced a few steps and the rails forming the bottom would be readjusted. It was found that this method of dumping would save three-quarters of the time required for the driver to stand in the wagon box and shovel out the contents. Zane's idea was promptly adopted by all the other teamsters employed on the National Road, and a slight modification of this invention is very widely used at the present time in connection with the hauling of sand and gravel, crushed rock, cinders and every other kind of low priced loose material. This bindering sand was indispensable in connection with all road work done previous to the invention of the rock crusher because rock "cracked" by hand does not produce any screenings or small sized material which can be used for binder purposes.

Zane's crude invention, so universally adopted, was never patented, but has been and still is immensely useful. It was many years before improved dump wagons were introduced. The first dumping vehicle used for the transportation of crushed rock was the two-wheeled dump cart first used in this country upon the construction of the Lancaster Pike in Pennsylvania. It was recommended by Macadam, the great English engineer, who achieved fame on account of the improvement that he accomplished upon the principal highways of England and Scotland about the beginning of the nineteenth century. The dump cart as described in one of the

early specifications upon which it was constructed contained the following items: "The dump cart shall consist of two artillery wheels with a hickory axle to provide a six foot tread, equipped with iron skeins strapped and bolted to axle, and close fitting brass hub-boxes. Mortised into the axle shall be two shaft poles of a size and shape to form the forward bearings for the dumping box and to provide a space for the working of the horse or mule. The dumping box of oak shall contain 15 cubic feet and be hinged at the center to the axle in such manner that the load of one ton shall be exactly balanced over the axle and help in place by means of a keeper-bolt at the front end of the box. A tail gate at the back of the box shall be provided with two keeper bolts. In this way the contents of the box may be easily dumped by the driver removing the three keeper bolts and allowing the 'cracked' rock or other material to pour rearwards and so discharge itself."

The standard dump cart of the period of 1860 to 1880 had a practical load of three-quarters of a yard or about one ton, being balanced on the axle. The horse working in the shafts had merely to draw the load and keep it steady. In a way the dump cart was what has been called a "horse-power wheelbarrow." When the haul was an exceptionally long one or a stretch of bad road was to be encountered a leader horse was hitched in front of the shafts by means of a single-tree hung by crosschains. This type of dump cart served a very useful period in the road construction of early times, for road contractors would frequently have as many as 100 cart teams that would trail out in a mile-long procession from the "rock cracking shed" to the road job. Coming back empty, they would clatter along at a trot with the negro drivers singing, "Swing Low Bright Chariot" at the top of their voices.

The efficiency of such an outfit was six loads at a distance of two miles or less from sun to sun, the driver doing all of the shoveling at the loading end and taking care of his horse, including the Sunday feeding. The driver, horse and cart was figured at a cost of $3.00 per day, which brought the delivery to exactly 50 cents a ton for all hauls less than two miles. These dump carts were not considered to be economical where the haul was no more than half a mile, wheelbarrows being invariably used for such a distance or less.

The one ton dump cart has gone into the discard since the improved bottom dump wagons, with their properly balanced wheel action and body suspensions, were introduced and brought to perfection. Modern dump wagons of 1½ and 2 ton capacity with spreader rigs and cut-under front truck to make short turns have proved a great convenience and brought in a very great saving in cost with low upkeep and very high efficiency as a load-carrying vehicle.

Road tractors were first introduced in connection with the propelling of heavy farm machinery such as threshing outfits, and have been developed more perfectly for the transportation of road material during the past five or six years to meet the necessity occasioned by the ever growing scarcity of local teams for road construction and other heavy contract work.

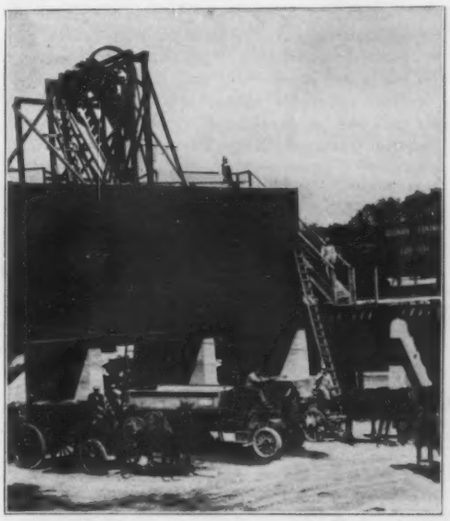
The caterpillar tractor is an adaptation of the road tractor to travel over very soft ground. It has been used with considerable success in all of the European theaters of war during the past year for the transportation of heavy artillery and the tremendous tonnage of war munitions to supply the big guns used by modern armies.

The invention of the horseless carriage, as it was first called at the time when Mother Shipton's prophecy was first fulfilled, or more properly the automobile, introduced many new ideas into the great transportation problem. The auto truck is without doubt the last and greatest achievement of the motor vehicle idea. The tremendous efficiency developed by European armies are largely to be attributed to the intelligent use of the motor truck.

WHITE MOTOR TRUCK AND TROY TRAILERS AT LEXINGTON, KY. RECORD, FOUR CENTS PER TON MILE.

Three, five and seven ton trucks have been built and put into economical and profitable operation by heavy contractors who have every type of loose materials to handle in connection with their operations. The operators of rock crushers and particularly road contractors find their auto truck equipment an economical, efficient and very profitable investment.

Among the advantages that the auto truck has to offer is the tremendous advantage of speed when running back light to the loading point. The dumping bodies of the heaviest trucks are just as convenient and easy to unload as was that primitive dump cart described above which could only carry a single ton per load, and yet one man operates the five or seven ton auto truck, and further the radius of his operations is not limited to two miles, nor even to 50 miles where occasion warrants such a haul. The testimony of the users of these vehicles in conjunction with the illustrations gives a very fair idea of the facts that our readers want to consider at the present time.



WILCOX CO.'S MECHANICAL LOADER—A TON IN FIVE SECONDS—AT CHICAGO, ILL.

Robert W. Davis, county engineer, Lexington, Ky., at a recent convention of the highway engineers of that state read a paper entitled, "Advantages of Modern Road Machinery," in which he said in part:

The present era is remarkable as one of rapid and convenient travel, transportation and communication. In this it is distinguished from all preceding years. Invention has shown more marked advance in this phase of modern civilization than in any other.

We find a group of machines available for earth road work, another for macadam construction and so on through various classes, some overlap in several classes. Of the machinery offered for earth road work certain types such as the leveler are for a rather limited kind of work, while others, such as the blade grader and elevating grader, are for more diverse uses. When a selection is to be made for a special work for which only one class of machine is made, one has only to choose the best bargains from the limited offering of the class, but when machinery is to be chosen for more diverse uses, operating characteristics and adaptability must be considered. It will usually be found that the selection may be narrowed down to two or three makes and the final choice will depend upon cost and personal preference.

A few years ago the cost of hauling over country roads was thought to be well established for ordinary conditions. Accurate cost data collected under varying conditions established a reasonable accurate ton-mile estimating cost of hauling with teams as varying between twenty (20) to thirty (30) cents. New developments in machinery have, however, placed at the disposal of the Road Engineer and Contractor other methods of hauling, which, under proper conditions, are much more economical than team hauling.

The steam and gasoline tractor with wagon trains, the motor truck alone, or with trailers, each have a definite field in which their use results in a saving over any other method that might be employed. In selecting between these classes of mechanical powers, the roads they are used over must be considered. The truck being built for speed as well as power, on favorable roads, can cover twice as much ground per day as the steam or gasoline tractors.

The following will show the accomplishments per day of a White good roads truck on Fayette County, operated alone, with one trailer and with two trailers. I have not figured the depreciation or interest on investment involved, but just intend to show a day's work done by a modern road hauling train:

Feb. 16. Truck alone. Covered 56 miles; hauled 18 tons. Cost for operation $6.73. (Gas, 18 gal. at 12 cts; 2 men, $4.25; oil, 32 cts.) Cost per ton-mile 6.6 cents.

Feb. 17. Truck and one trailer. Covered 48 miles; hauled 31½ tons. Cost for operation $7.61. Cost per ton-mile 5 cents.

Feb. 18. Truck and two trailers. Covered 48 miles; hauled 45 tons. Cost for operation $8.73. Cost per ton-mile 4 cents.

Observe where one trailer was used, 13½ tons were delivered for 88 cents, and where the two trailers were used 27 tons were delivered for $2.00. If the last day's hauling had been by teams at $3.50 per day it would have taken 15 teams costing $52.50 as to $8.73 for truck and trailers; making $43.77 for County in one day. The trailers used were Troy truck 4 yard trailers. Since we can see the efficiency of any hauling outfit is in proportion to its ability to deliver material cheaply.

Probably the most serious danger that confronts the County or Contractor is the depreciation in value of the small road plant. A plant suitable for most economical results in road building is available, but it is expensive and a large amount is required. The capital invested must remain idle so much of the year, unless this plant can be disposed of at a reasonable price upon completion of the work, profits are tied up in equipment that may be of little use on next work.

A large plant, centrally located, from which hauling equipment can be operated the whole year, has many advantages over smaller ones; better graded stone is obtained; in rural communities labor is usually scarce, more substantial buildings and equipment can be installed, thereby saving depreciation, a more trained force is organized and all is brought nearer under the eyes of the engineer or superintendent at all times. Thus with such advantages in hauling and possibly more in preparation of materials, we should save much in the construction of our roads.

In the maintenance of road, probably no one feature is more important than drainage. A strong proof of this is the numerous makes of machines built for this purpose. In looking over this field for a modern money saver, one cannot pass the elevating grader, a machine having been in use on railroad fills and borrow pits for some time, but very seldom seen ditching turnpikes. Most engineers and contractors are familiar with the cost of moving dirt from the ditches by hand and the small amount of mileage a force can cover in the spring of the year while it is not so hard, but few have ever seen enough men together to load ten two-yard wagons in five minutes; such is the record of one of these machines on one of our roads.

Probably the cost of ditching by hand ranges from twenty (20) to thirty (30) cents per cu. yard. Last year we moved around 20,000 cu. yards at a cost of ten (10) to twelve (12) cents per cu. yard. This machine, where rock is not too bad, is a great saver and will pay for itself in a short time. Some three or four makes are sold—this one being a National, made by the Good Roads Machinery Co.

The Packard Motor Car Co. build a complete line of worm driven motor car trucks ranging in capacity from one to six tons. More than 300 trucks of their build are directly or indirectly being used in building improved highways.

A striking example of the supremacy of the motor truck in road-building is given in Multnomah County, Ore. Here the county commissioners are at work on 70 miles of hard surface road, the work to be completed in 90 days. This hitherto unheard of speed in road building is made possible by the use of motor trucks. A fleet of 50 Packard trucks is engaged on the job, most of them of the

(Continued on page 49.)

SAND and GRAVEL

Excavators to Economize Handling of Material

BY H. B. SAUERMAN.

In a previous article a brief history, a general description and the adaptability of the dragline cableway excavator were set forth. In this article a description of the details and illustrations of a few typical installations will serve to show the adaptability of the dragline cableway excavator to sand and gravel handling plants of small capacity.

Many small sand and gravel producers, as well as some contractors, find that a small sand and gravel handling plant of moderate first cost would

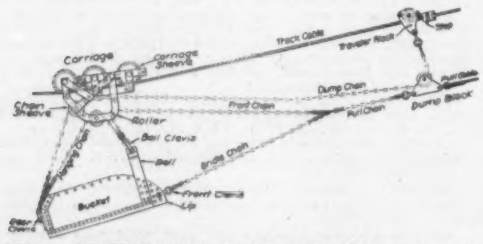


FIG. 1. BUCKET AND CARRIAGE WITH CONTROLLED DUMPING ARRANGEMENT.

pay a good dividend, where a large plant would be entirely out of the question. The dragline cableway excavator operating in connection with a small screening plant fully meets the demand of a plant of moderate first cost and is one which will operate with a low cost of maintenance and operation.

There are two types of small screening plants which are usually installed in connection with the dragline cableway excavator; namely, the revolving screen type and the gravity screen type. The revolving screen plant produces the best results where the material contains considerable dirt or foreign matter. The washing and screening arrangement consists usually of a cylindrical scrubber about four feet long equipped with baffle plates. The material upon entering this scrubber is thoroughly churned and the dirt and foreign matter is thus dissolved or suspended in the water. From the scrubber the material passes into a revolving screen having sections, from three to five feet in length, of different perforations to properly size the material. Water is fed into the scrubber and screen at the rate of 300 to 800 gallons per minute, the amount depending upon the condition of the material and the handling capacity of the plant. The fine sand and the water is sluiced to a settling tank where the sand drops to the bottom of the tank and the dirt passes off at top in solution in the water. These settling tanks are either hand operated or automatic.

The inclined gravity screen plant has the advantage in first cost over the revolving screen plant. Its operation cost is practically nil, as it requires no power. The results obtained will depend largely upon the material. Where the material contains much clay or other foreign matter the gravity screen cannot be used to advantage. In fairly clean material, especially material brought up from river bottoms, good results are obtained with the gravity screen.

Most of the gravity screens are designed with a washing table or trough at top of plant. The incline of this table or trough is very slight. Some of the latest types of gravity screening plants are equipped with special washing troughs which give the material a churning action before it is delivered to the gravity screens. The material is poured from the excavator bucket onto the washing table or troughs. A stream of water applied to this material washes it down over the different inclined screens. A hand-operated settling tank is usually installed to handle the fine sand. The structure supporting the screens should be so designed that the inclination of the screens can be readily adjusted or changed. Where large boulders are encountered, a set of grizzly bars are placed over the hopper or washing table to by-pass the boulders.

To get the best results with either of the plants described, it is necessary that the material is fed to the screens at a slow rate of speed, for if the material is dumped in large quantities on the screen or washer it will be impossible to properly wash and screen the material. To accomplish this it requires a cableway excavator equipment so designed that the dumping operation is under the positive control of the operator; it is further necessary that the bucket takes a vertical position in dumping to insure that all the material leaves the bucket where sticky or wet material is encountered. Fig. 1 shows a bucket and carrier equipped with a dumping arrangement whereby the bucket is dumped by a continuous forward pull on the load line. This puts the dumping operation under the positive control of the operator. The bucket is hung on a hanger chain with the center of gravity slightly in rear of the roller over which the hanging chain travels. This reduces the power required to dump the bucket to a minimum, as it is only necessary to tilt the bucket forwardly on its roller support. As the front of the bucket drops gravity assists the dumping operation.

Figs. 2 and 3 show a screening plant equipped with a revolving screen. This plant was installed in connection with a one-cubic-yard dragline cableway excavator designed to operate on a span of 500 feet. From the general view of pit (Fig. 3) it will be noted that the sand and gravel is free from large boulders. As no boulders are encountered the material is delivered from excavator bucket directly to the hopper. The material is delivered by gravity from hopper to an inclined screen. The oversize material passes over screen directly into a crusher, the material which passes through screen is delivered to a boot located underneath crusher. The material which is crushed by passing through crusher is also delivered to this boot. All of the material is then elevated from boot by means of a bucket elevator to the overhead revolving screen. This screen separates the sand and gravel into four sizes and delivers it to small receiving hoppers located underneath the screen. The hoppers are equipped with spouts which deliver the material directly to cars. The material at this plant is very clean and as the market at this point does not call for washed material no washing system has been installed.

The dragline cableway excavator is operated by a nine-by-10-inch double cylinder, double drum steam hoisting engine. This engine is rated at 35 horsepower. The hoist receives steam from a cen-

FIG. 2. SCREENING PLANT OPERATING IN CONNECTION WITH ONE-CUBIC-YARD DRAGLINE CABLEWAY EXCAVATOR.

FIG. 3. GENERAL VIEW OF CABLEWAY EXCAVATOR AND PIT.

tral power plant which also furnishes steam for engine which operates another crusher and the other machinery. This plant has a handling capacity of 300 to 400 cubic yards per 10-hour day.

Figs. 4 and 5 show a screening plant equipped with gravity screens and which operates in connection with a 500-foot span dragline cableway excavator. The cableway excavator is supported on a timber mast which is trussed as shown in Fig. 4. The bucket operating on this cableway is of one-cubic-yard capacity; it is of heavy construction and equipped with a manganese steel lip and teeth. The carrier is equipped with self oiling sheaves and hardened steel bearings. This bucket and carrier is also equipped with the same dumping arrangement as shown in Fig. 1.

The cableway is operated by a two-speed electric hoist. The speed of the loading cable when bucket is digging is 125 feet per minute and 375 feet per minute after the bucket has been lifted clear of the excavation and traveling on track cable.

The gravity screen arrangement is the same as described above. The material is graded into four sizes and delivered into bins located over two switch tracks. This arrangement makes it possible to load two cars at the same time. A complete washing system is installed in connection with

FIG. 5. GENERAL VIEW OF CABLEWAY EXCAVATOR AND SCREENING PLANT.

the plant which consists of a five-inch centrifugal pump with a pipe system to deliver water to the different screens.

Fig. 6 shows a small dragline cableway excavator operated by a steam traction engine and a belted hoist. This cableway excavator was used for excavating gravel for road building purpose. The gravel was excavated from under water and put in a storage pile. It was then hauled by team and wagon to the different roads. The dragline cableway excavator has been a factor in reducing the cost of road-building. Many county and highway commissioners have found it to advantage to purchase and install a dragline cableway excavator for digging gravel for constructing their highways.

The dragline cableway excavator, like all other material-handling machinery, has its limitations. For sand and gravel producing plants, where conditions and requirements are at all favorable, it is without doubt one of the most economical and efficient means for excavating, conveying and elevating material from pit to plant. The moderate first cost, the low cost of maintenance and operation of the excavator should receive careful consideration by all sand and gravel producers as well as all contractors who are engaged in concrete construction and road building.

John M. Settle, of the Ohio River Sand Co., Louisville, Ky., reports a steady business for September. The company has secured the contract to furnish all sand to be used in the construction of the new Speed building, which will be one of the largest structures in Louisville.

FIG. 6. CABLEWAY EXCAVATOR DELIVERING SAND AND GRAVEL TO STORAGE PILE.

Sand and Gravel Production in 1914*

BY G. F. LOUGHLIN.

In 1902 the value of sand crushed from sandstone and used in the manufacture of glass was for the first time separated from the figures given for stone by the United States Geological Survey and was published in a separate report, which included also the value of other sand used for glass. The process of collecting the figures for 1902 and 1903 revealed a considerable quantity of sand used for molding, building, and various other purposes, and in 1904 it was possible to show approximately the total quantity and value of such sand produced for that year. In 1905 more complete statistics of the total production of sand were obtained, and it was also possible to tabulate the approximate production of gravel. The following

QUANTITY AND VALUE OF SAND AND GRAVEL PRODUCED IN U. S., 1904-1914, IN SHORT TONS.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
1904	10,679,728	a $5,748,000	1910	69,410,436	$21,037,630
1905	23,204,987	11,223,645	1911	68,846,959	21,158,583
1906	32,932,002	12,698,208	1912	68,354,561	23,113,208
1907	41,851,918	14,492,069	1913	79,558,849	24,217,508
1908	37,216,044	13,270,032	1914	79,281,735	23,846,999
1909	59,565,551	18,336,990			

a Includes a very small quantity of gravel.

table shows the total production of sand and gravel, including glass sand, from 1904 to 1914:

Historical Review.

More complete returns account principally for the large apparent increase during recent years as compared with 1904. The large increase in quantity and the small increase in value in 1906 and 1907 were mainly in the production of cheap gravel for filling, road ballast, and other uses. In 1908 there was, as in most other industries, a decrease in both quantity and value of production, owing to unsettled financial conditions, but in 1909 there was a large increase, due to the great activity in the building trades, in railroad building, and in the iron industry. In glass sand, however, there was only a slight increase. The production of glass sand and molding and building sand continued to increase in 1910. In 1911 there was a small decrease in total production, although the production of glass sand continued to increase. In 1912 and 1913 the total production increased, though special conditions caused a decrease in the production of certain kinds of sand.

With the exception of 1908 and 1911 there has been a steady increase in total production in both quantity and value to 1913, inclusive. The production in 1914, however, shows a decrease in quantity and in value.

*Mineral Resources of the United States.

In view of slackened building demand in 1914 the decrease in output of sand and gravel was relatively small. The total production of sand and gravel in the United States in 1914 reported directly to the United States Geological Survey was 79,281,735 short tons, valued at $23,846,999, a decrease in quantity of 277,114 short tons and in value of $370,509 from the production of 1913. It exceeded, however, by 10,927,174 tons in quantity and $733,791 in value the production of 1912, and by 9,871,299 tons in quantity and $2,809,369 in value the production of 1910, when the largest output previous to that of 1913 was recorded.

Notwithstanding the decrease in total production, there was increase in the value of grinding and polishing sand, of paving sand, of sand for railroad ballast, and especially of gravel. The most conspicuous decrease in value was in molding sand and in fire and engine sand.

Trade conditions in most of the states which show large production were not so favorable in 1914 as in 1913. In the important Eastern states

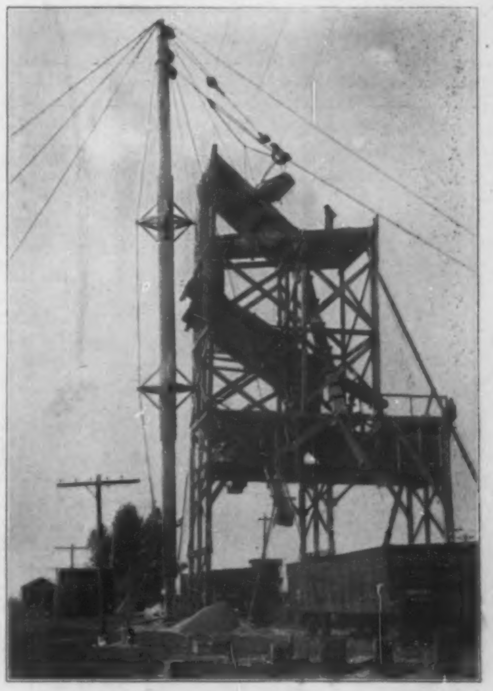


FIG. 4. CABLEWAY EXCAVATOR DELIVERING MATERIAL TO A GRAVITY SCREENING PLANT.

most producers reported conditions to be poor, although a small number had increased production, owing to local demand. The same condition prevailed in the Central states, with the exception of Michigan and Iowa, where the producers who reported conditions as about the same as in 1913 were more numerous than those who reported decreased production. In California more than 50 per cent of the producers reported better conditions in 1914 than in 1913.

The production of glass sand in 1914 amounted to 1,619,649 short tons, valued at $1,568,030, a decrease of 172,151 tons, or 9.6 per cent, in quantity and of $327,961, or 17.3 per cent, in value from the production of 1913. The average price per ton fell from $1.06 in 1913 to $0.97.

The decrease in the production of molding sand in 1914 was 812,374 short tons and $473,834, or 22.7 per cent in quantity and 21.2 per cent in value. The average price increased from 63 cents to 64 cents a ton. The production of molding sand in 1914 was less than in any year since statistics have been collected by the Survey, with the exception of 1908. The decrease in that year was even more than in 1914, but the recovery was rapid and the production two years later, in 1910, was the greatest in quantity that has been recorded. The production of molding sand reflects to a considerable extent the condition of the iron and steel industry.

The accompanying tables give the production of the various kinds of sand and the production of gravel by states in 1914:

Sand for building purposes constituted, as in previous years, more than one-half of the total sand production. The production in 1914 was 24,003,962 short tons, valued at $7,688,774. This was a decrease of 1,393,421 tons, or 5.4 per cent, in quantity and of $319,275, or 3.9 per cent, in value from the production of 1913. The average price per ton, which increased from 31 cents in 1911 to 33½ cents in 1912 and decreased to 31½ cents in 1913, increased to 32 cents in 1914. Decrease in output and value was not general, as some producers reported an increase both in quantity and in price per ton.

The production of grinding and polishing sand, which decreased in 1913, showed a marked increase in 1914 and was again above 1,000,000 tons. Although the output was 100,000 tons less than in 1912 (the year of highest production), it was more than 200,000 tons greater than in 1911. The production in 1914 was 1,084,871 tons, valued at $652,388, an increase in quantity of 143,498 tons and in value of $111,989 over the production for 1913.

The production of fire sand and furnace sand, like that of molding sand, decreased greatly. The quantity produced in 1914 was 318,560 tons and the value was $187,467, against 519,061 tons, valued at $364,363, in 1913, a decrease of 200,501 tons in quantity and of $176,896 in value.

The production of engine sand increased in quantity from 1,033,450 tons in 1913 to 1,262,790 tons in 1914, but the value decreased from $401,806 to $367,548.

Paving-sand production increased slightly in both quantity and value, from 3,335,508 tons, valued at $1,020,389, in 1913 to 3,580,171 tons, valued at $1,121,999, in 1914.

The production of sand for railroad ballast actually reported to the Survey was 2,116,429 tons, valued at $322,740, in 1914, as against 2,335,196 tons, valued at $266,852, in 1913. The increase in value, notwithstanding a comparatively small decrease in quantity, is notable. The reported production does not represent the total quantity of sand used for ballast by the railroads, for the reason that some railroads keep no record of the quantity of sand produced and used by them in making cuts and in ballasting their roadbeds. With them it is only a matter of moving material from one point on the right of way to another point.

The production of gravel in 1914 exceeded that of building sand by more than 15,000,000 tons, an excess which was 2,000,000 tons more than that in 1913. The total production of gravel in 1914 was 39,212,858 tons, valued at $9,398,897, an increase in quantity of 686,360 tons and in value of $556,086 over the production of 1913. These figures show an average cost per ton of nearly 25 cents, as compared with slightly less than 23 cents in 1913 and about 26 cents in 1912. This large quantity of gravel was used for many purposes, including concrete, paving, filter beds, roofing, road making, and railroad ballast. The total production of all kinds of sand in 1914 was 40,068,877 short tons, valued at $14,448,102, an excess of 856,019 tons in quantity and of $5,049,205 in value over the production and value of gravel during that year.

The entire report of the production of sand and gravel is necessarily incomplete, because it is impracticable to attempt to get reports or to estimate the quantity of sand produced by the thousands of individuals who each year dig a small quantity for their own use. This production, of which there is no count or accounting, may average less than a ton for the individual producer, but the aggregate may be hundreds of thousands of tons. The figures each succeeding year should be nearer the actual production, as the list of producers is added to annually.

The gravel figures for 1914 do not include a considerable quantity of chats or tailings from the Missouri zinc mines. The production of chats in Missouri in 1914 was 2,270,771 tons, valued at $340,616.

The unit of measurement given in the tables of production is the short ton. Much of the sand is reported as sold by the cubic yard, a cubic yard varying in weight from 2,300 to 3,000 pounds, according to the condition of the sand, to the material of which the gravel is composed, and to the custom of the locality. All of the glass sand is sold by the short ton, and also a considerable quantity of the molding, building, and other sand; hence the quantities reported were all reduced to this unit.

Sand Imports.

Sand valued at $139,675 was imported into the United States in 1914, as compared with imports valued at $172,257 in 1913, $141,690 in 1912, and $147,268 in 1911. This is largely building sand brought to the United States as ballast, or from Canada as a near source of supply; but it includes a small quantity of French molding sand which comes to this country barreled in lump and is here ground and pulverized before marketing.

HALLIDAY LOSES SAND DREDGE.

The steam dredge "Virginia," which has been operated by the H. H. Halliday Sand Co. on the Ohio river near Cairo, Ill., and which pumped annually a large supply of sand and gravel for that company, was entirely destroyed by fire on Thursday, Sept. 16. Arrangements were made immediately for the securing of another boat in order to keep the market supplied until such a time as a new dredge can be built.

In planning for the construction of a new boat, H. H. Halliday states that he hopes to be able to produce gravel with or without sand of different grades and sizes, in addition to several different sizes of washed and screened Ohio river sand. Many inquiries for a coarser and finer grade than that usually carried in stock have reached Cairo and the necessity of immediately constructing a new dredge lends impetus to rushing provisions for the extra grades of material.

PRODUCTION OF SAND AND GRAVEL IN THE UNITED STATES FOR 1914 IN SHORT TONS.

State.	Glass sand.		Molding sand.		Building sand.		Grinding and polishing sand.		Fire and furnace sand.		Engine sand.		Paving sand.		Railroad ballast sand.		Other sands.		Gravel.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama			93,551	$43,702	152,800	$51,782	8,682	$4,104	32,135	$6,430	12,040	$3,127	5,849	$4,586			10,112	$9,813	327,891	$136,660	831,430	$362,219
Arizona					(a)	(a)															(a)	(a)
Arkansas			(a)	(a)	90,669	37,625					(a)	(a)	(a)	(a)			(a)	(a)	673,924	278,876	789,371	325,360
California	(a)	(a)	5,965	5,362	279,723	85,057	196,263	42,701	(a)	(a)	16,954	2,538	106,578	26,714			33,234	8,384	3,256,718	595,449	3,900,540	777,334
Colorado			(a)	(a)	28,275	8,480			(a)	(a)	5,400	2,490							7,610	3,310	41,614	14,781
Connecticut			(a)	(a)	22,375	7,835	(a)	(a)					(a)	(a)			(a)	(a)			24,343	8,128
Delaware			(a)	(a)					(a)	(a)											(a)	(a)
District of Columbia					(a)	(a)													(a)	(a)	(a)	(a)
Florida			(a)	(a)	47,572	36,136					(a)	(a)	29,000	7,000	(a)	(a)			98,435	10,637	177,241	54,120
Georgia	(a)	(a)	16,427	6,247	300,300	51,782	2,280	835	14,000	4,300	5,032	965	5,610	1,400			4,973	2,296	12,244	7,875	260,425	80,130
Hawaii					(a)	(a)											(a)	(a)			(a)	(a)
Idaho					(a)	(a)													(a)	(a)	(a)	(a)
Illinois	239,551	$246,593	347,543	300,011	1,196,873	333,200	56,351	36,790	40,674	24,860	93,299	12,230	121,812	39,851			522,808	120,635	4,955,219	793,422	7,696,130	1,859,519
Indiana	36,977	14,136	311,063	83,733	1,873,953	467,691					49,174	9,238	158,443	55,290	77,362	$6,485	119,041	27,930	4,184,093	682,533	6,810,706	1,367,038
Iowa	(a)	(a)	1,582	2,365	886,561	272,445	(a)	(a)	(a)	(a)	13,119	3,250	201,900	64,340	37,749	3,115	6,518	2,441	1,087,967	205,820	2,253,254	556,868
Kansas					982,462	310,547	(a)	(a)			29,458	8,631	137,582	37,306	(a)	(a)	12,497	3,259	160,283	19,512	1,347,394	381,065
Kentucky	(a)	(a)	33,400	26,318	435,641	237,639	(a)	(a)	2,294	1,643	11,807	4,315	21,653	14,272			236,230	36,393	815,796	308,770	1,563,496	539,335
Louisiana	(a)	(a)			232,874	76,564					5,085	1,730	(a)	(a)	29,061	4,230	(a)	(a)	738,510	190,717	1,051,930	284,297
Maine					(a)	(a)													(a)	(a)	(a)	(a)
Maryland	(a)	(a)	(a)	(a)	445,082	165,827	(a)	(a)			19,494	18,399	227,750	76,212			(a)	(a)	760,204	268,338	1,571,124	523,720
Massachusetts	(a)	(a)	12,452	7,467	316,021	162,880	(a)	(a)	(a)	(a)	(a)	(a)	78,380	33,161	(a)	(a)	11,701	3,905	177,642	50,795	645,773	287,218
Michigan	36,035	31,386	83,400	36,563	1,088,650	380,152	(a)	(a)			6,357	1,066	320,322	74,866	7,365	781	10,336	2,437	2,140,359	530,338	3,757,979	1,143,771
Minnesota			26,270	24,291	315,308	116,191	(a)	(a)	(a)	(a)	(a)	(a)	36,458	15,066	22,080	14,900	33,344	9,698	637,900	236,704	1,074,436	417,979
Mississippi			(a)	(a)	92,867	25,428					45,887	9,396			(a)	(a)			1,500,391	354,855	2,144,267	499,726
Missouri	190,190	112,484	53,837	26,656	1,788,277	541,741	102,568	54,283	4,486	1,800	43,619	15,872	30,327	6,485	(a)	(a)	(a)	(a)	1,321,839	257,827	3,528,678	1,020,903
Montana			(a)	(a)	3,246	4,005							(a)	(a)					13,310	11,970	17,854	17,075
Nebraska					686,155	113,941					14,000	1,945	5,250	610	(a)	(a)	(a)	(a)	88,026	16,435	859,982	141,319
Nevada											(a)	(a)							(a)	(a)	(a)	(a)
New Hampshire																			670,000	112,500	670,000	112,500
New Jersey	83,927	62,395	376,606	237,798	1,704,011	394,092	21,137	23,207	40,454	33,367	62,534	21,849	110,260	39,902			61,869	59,089	2,204,880	672,433	4,665,677	1,544,322
New Mexico					(a)	(a)					(a)	(a)							(a)	(a)	(a)	(a)
New York	(a)	(a)	439,121	309,324	3,867,515	920,909			16,277	7,861	23,649	10,003	82,725	31,146	392,968	46,530	78,556	20,702	2,149,310	801,762	7,670,820	2,239,169
North Carolina			(a)	(a)	31,743	15,468									(a)	(a)			211,059	42,438	492,092	72,909
North Dakota					12,335	5,600													10,875	5,725	23,210	11,325
Ohio	138,865	131,766	647,390	417,314	1,746,457	660,527	24,343	45,186	33,157	30,668	73,285	26,447	497,025	134,370			120,874	86,183	2,417,806	634,833	5,510,879	2,157,131
Oklahoma	(a)	(a)			896,432	435,313					4,858	1,362	[illegible]	[illegible]	(a)	(a)	35,421	16,081	505,737	225,550	1,477,618	713,117
Oregon	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pennsylvania	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rhode Island	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
South Carolina	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
South Dakota	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tennessee	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Texas	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Utah	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vermont	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Virginia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Washington	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
West Virginia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wisconsin	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wyoming	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Concealed totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	1,619,649	1,568,030	2,751,209	1,756,363	24,003,962	7,688,774	1,084,871	652,388	318,560	187,467	1,262,790	367,548	3,580,171	1,121,999	2,116,429	322,740	3,331,236	782,773	39,212,858	9,398,897	79,281,735	23,846,999

a Included in "Concealed totals."

ROAD BUILDING

Northwestern Road Congress Program.

The Northwestern Road Congress, which will be held at Cedar Rapids, Iowa, Oct. 4-7, will be attended by at least 2,500 delegates comprising state highway departments, state engineering departments, county highway commissions, city mayors, council members, automobile clubs, road machinery and material men and members of commercial clubs of the nine states participating in the congress, according to James P. Keenan, secretary.

The congress which was organized last October at Milwaukee, Wis., comprises men interested in road construction and maintenance in Michigan, Wisconsin, Illinois, Minnesota, Iowa, North Dakota, South Dakota, Missouri and Indiana. George W. Cooley, state highway engineer of Minnesota, is president of the congress.

The advance program shows an attempt has been made to secure the best possible speakers for this congress and will be the principal factor in making the second meeting of the members of this organization a complete success. The program for the four-day convention is as follows:

First Day's Session.

First day, October 4, 2:00 p. m., President George W. Cooley, presiding.

George W. Clarke, Governor of Iowa, address.

Mayor Louis Roth, Cedar Rapids, Iowa, address.

John M. Grimm, Linn County Highway Association, address.

J. P. Keenan, secretary Northwestern Road Congress, response.

Bert W. Williams, collector of internal revenue, Madison, Wis., "The Value of Good Roads to a Community."

Progress reports of states of the congress by representatives of state highway commissions.

Eight p. m., smoker and reception under the auspices of the Cedar Rapids Commercial Club at the Hotel Montrose.

Second Day.

Second day, Oct. 5, 10 a. m., W. G. Haskell, county counsel, Lincoln Highway Association, presiding.

George W. Cooley, Minnesota state engineer, "Development of a Road System for Western States."

D. W. Norris, Jr., chairman Iowa Better Roads Committee, "Financing Road Improvements."

A. D. Gash, president Illinois Highway Commission, "The Proper Distribution of Money in Road Building."

Logan W. Page, director U. S. Department of Public Roads, and P. St. John Wilson, deputy director, "The Nation-Wide Good Roads Movement—Its Present and Future."

Joe L. Long, editor, Road Maker, "How to Stimulate Interest in Road Building."

Afternoon Session.

Col. Frank Buffum, Missouri Highway Commission, "Convict Labor on Roads."

F. F. Rodgers, Michigan State Highway Commission, "State Reward—Its Effect in Stimulating Local Activity."

Dean A. Marston, Iowa State Highway Commission, "The Highway Engineer—His Present and Future Field."

Robert C. Carson, organizer Red Ball Route, "Possibilities of Developing Local Coöperation for Improving National Highway and Cross-State Highway Routes."

John A. Hazelwood, president Wisconsin State Highway Commission, "Needed Legislation."

Third Day.

Third day, Oct. 6, 10 a. m., W. E. McCarty, chairman Milwaukee County Board of Supervisors, presiding.

A. R. Hirst, Wisconsin state engineer, "State Aid and State Supervision."

T. H. McDonald, chief engineer, Iowa State Highway Commission, "Earth Roads—Their Possibilities and Limitations."

J. J. Mullen, Minnesota state road engineer, "Gravel Roads."

W. K. Tavel, C. E., St. Augustine, Fla., "Brick Roads of Florida."

H. J. Kuelling, Milwaukee county highway commissioner, "Concrete Roads."

W. W. Marr, Illinois state highway engineer, "The Value of a Traffic Census in Determining the Type of Road to be Constructed."

R. L. Bell, Illinois highway commission, division engineer, "Brick Monolithic Construction of County Highways."

Auto Tour.

Automobile tour of roads under the auspices of the Cedar Rapids Commercial Club.

Fourth Day.

Fourth day, Oct. 7, 10 a. m., George W. Cooley, presiding.

Clifford Older, bridge engineer, Illinois Highway Commission, "Concrete Highway Bridges."

J. H. Ames, bridge engineer, Iowa State Highway Commission, "Steel Bridges."

C. C. Nagel, bridge engineer, Minnesota Highway Commission, "Reinforced Concrete."

Reports of committees and election of officers.

Adjournment.

Road Congress Meets in Oakland.

The Pan-American Road Congress assembled in Oakland, Cal., on Monday, Sept. 13, and has been in session in that city and in San Francisco during the greater part of the week. The American Association of State Highway Officials, the Tri-State Good Roads Association, the Pacific Highway Association, the American Road Builders' Association and other organizations also met here and their sessions have been generally merged with the Pan-American Road Congress.

In the absence of Governor C. W. Gates of Vermont, president of the organization, the congress was called to order by James H. MacDonald, of Connecticut. During the opening session addresses were made by John W. Stetson, representing Governor Johnson, of California; A. E. Meath, state treasurer of Washington; Frank Terriss, also of Washington; H. K. Bassett, representing the Panama-Pacific Exposition; G. W. Tillson, president of the American Road Builders' Association, and C. P. Light, of the American Highway Association.

During the Monday afternoon session, papers were read by the following: Logan W. Page, director of public roads, United States Department of Agriculture; S. E. Bradt, secretary of the Illinois State Highway Commission; Henry S. Graves, chief of the Bureau of Forestry, United States Department of Agriculture; A. N. Johnson, of the Bureau of Municipal Research of New York City; Colonel E. A. Stevens, commissioner of public roads, New Jersey, and C. L. MacKenzie, president of the Good Roads Association of Washington.

Monday night the delegates were the guests of the Oakland Commercial Club at a smoker.

Tuesday's session opened with George W. Tillson in the chair. The speakers on that day included: William R. Roy, Paul D. Sargent, George W. Cooley, R. K. Compton, W. S. Gearhart, Clifford Older, Walter Coggeshall, N. P. Lewis, J. F. Witt, A. B. Fletcher, H. R. Carter, Prof. L. S. Smith and A. D. Williams.

Tuesday the annual banquet was held at the Hotel Oakland. Wednesday was Pan-American Road Congress Day at the Exposition in San Francisco. The balance of the week was given over to the Exposition and to various outings. Sunday those who wished left for a trip to Yosemite Valley.

PHILADELPHIA ROAD WORK.

Bids were recently received in the department of public works of Philadelphia for highway work covering about 100 streets. The estimated cost of the work is $475,000. Work for which bids were received included: Grading, $43,400; paving with vitrified block, $1,000; paving with bituminous paving, $13,000; various kinds of repaving, $147,250; surfacing, water-bound macadam, $52,800; surfacing, bituminous macadam, $15,210; resurfacing, water-bound macadam, $5,000; resurfacing, bituminous macadam, $8,200.

BRADLEY MILLS IN DEMAND.

The Bradley Pulverizer Co., of Allentown, Pa., and Boston, Mass., has just shipped a Bradley three-roll mill installation to the Geneva Limestone Co., Geneva, N. Y., and has received an order for another installation from the Rockland & Rockport Lime Co., Rockland, Maine. These mills are to be used for the purpose of pulverizing limestone for agricultural purposes. The Bradley Pulverizer Co. has been very successful in the last two years in supplying its mills for this purpose, it having installed a great number of mills, all of which are giving the very best of satisfaction.

The Bradley three-roll mill takes limestone three-quarters inch and under and reduces it to a very finely ground finished product in single operation. It simplifies the limestone pulverizing plant and produces this material at an exceptionally low cost. One user has had a Bradley three-roll mill running for over two years and the total cost for maintenance has been less than $25.00

The Bradley Pulverizer Co. is very pleased to give a complete list of installations and will send catalogue and sample of ground material to parties desiring same. With the new works at Allentown, Pa., the company is in a better position than ever to give prompt shipment of mills.

This company also manufactures the Bradley Hercules and Giant Griffin mills, which are universally used for the purpose of pulverizing all dry refractory materials where a finely ground finished product is desired. They are especially adapted for cement mill use and are in use in many of the largest cement plants throughout the world.

Representatives of the Canadian Manufacturers' Association conferred with representatives of the Trades and Labor Council and representatives of the Winnipeg Builders' Exchange last week with respect to a proposed workmen's compensation act for Manitoba.

The New Thew Combination Boom Shovel

The Thew Automatic Shovel Co., of Lorain, Ohio, which has been responsible for many advanced ideas in steam shovel construction, has just placed a new machine on the market known as the Thew combination boom shovel.

In this new machine, the Thew horizontal crowding motion, an exclusive feature of Thew shovels for more than 15 years, is combined with shipper shaft mechanism of new design. Thus, in this new machine, is afforded the proven economy of the horizontal crowd for shallow cuts, removal of concrete and macadam, and general excavating work; together with a jack shaft crowding motion which is ideal for sewer trench work, or other contracts where extended dumping radius high clearance lift is desired.

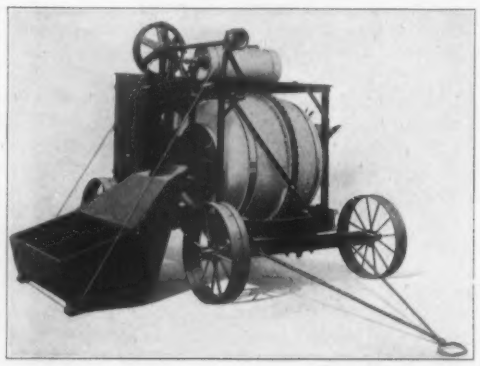
The two crowding mechanisms are independent and non-interfering. Both are operated from the same crowding engine, which is simply changed in position. When using the horizontal crowd the long dipper handle must be removed and when the shipper shaft crowd is in use, the short dipper arm is chained to the boom structure after removing the dipper. All changes necessary can be made in less than three hours. The same dipper can be used with either crowding mechanism but a special sewer trench dipper will be furnished, if desired.

The trussed and reinforced boom of the Thew shovel, and the manner in which it is attached to the turntable by wide hinge castings, provide unusual strength and rigidity, and naturally add to the operating efficiency and durability of the machine.

The long dipper handle used in connection with the jack shaft crowding mechanism combines lightness and strength. It is made of a single piece of wood, eight inches square, armored with steel plates and equipped on under side with steel racks. These dipper arms can be had in numerous lengths to suit requirements of different kinds of work, depending upon the depth of trench, extent of dumping radius, or height of clearance lift desired. A dipper with 27 feet stick can dig a trench 16 feet below the ground on which the shovel stands. A stick of this size makes it possible to dump material in a radius of 31 feet and with a clearance of 14 feet.

The single dipper stick in connection with the design of the Thew boom affords a combination of unusual strength and effectiveness. The single stick is of the simplest possible construction, is less liable to get out of alignment, or bow out of shape, than if it were constructed in two parts as has been customary, and is also lighter and stiffer.

When the dipper is lowered into a trench, the dipper stick passes down between the side members or dipper arm guides of the combination boom, thus distributing any side thrust or undue strain encountered. It is obvious that this construction affords far greater strength than if it were necessary for this lateral strain to be borne solely by the shaft upon which the dipper stick is mounted.



NO. 10 REX MIXER WITH POWER LOADER.

This combination boom Thew shovel gives the operator a machine with which he can handle practically any kind of work encountered. It is of particular interest also because the contractor can have either kind of crowding motion incorporated when the machine is purchased, and the other mechanism can be purchased and added at a later date, when the occasion requires.

A number of these machines have been in use for several months, and they have performed their work satisfactorily under the most trying conditions. Literature describing this new shovel is now being prepared, and will be sent to anyone interested who will address The Thew Automatic Shovel Co., Lorain, O., and make their wishes known.

Paul & Cornell Co., Newsom, N. C.; capital, $25,000; for the purpose of developing quarries of stone and rock; incorporators, Charles Paul, Newsom, N. C.; A. P. Cornell, Barnwell, S. C.; Leon P. Tobin, Burnley, Va.

TYPE "O" THEW COMBINATION BOOM STEAM SHOVEL, SHOWING SHIPPER SHAFT MECHANISM DIGGING TRENCH. HORIZONTAL CROWDING BOOM IS ALSO USED ON THIS MACHINE.

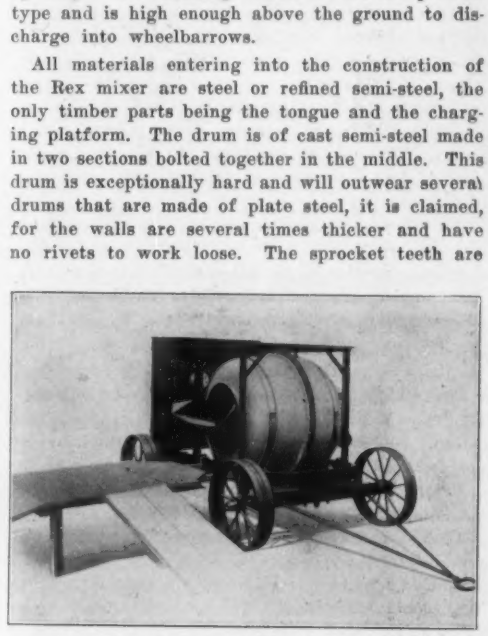
REX MIXER HAS MANY ADVANTAGES.

The most satisfactory kind of a mixer is one that will meet the contractor's needs under the most trying conditions. The No. 10 Rex mixer is a one bag machine with the low charging features. This machine can also be equipped with a power loader and automatic water tank if the contractor desires it. The mixer can also be supplied with steam engine and boiler, gasoline engine and electric motor.

Due to this there are few conditions that a contractor using a mixer could not use a No. 10 Rex mixer to advantage.

The No. 10 Rex has a capacity of 10 cubic feet of unmixed material and will thoroughly mix and discharge a batch of concrete in 45 seconds. The charging platform is but 22 inches above the ground, allowing the wheelbarrows to run up an easy incline to charge the mixer drum, which has a 21-inch opening. The discharge chute is of the pivoted type and is high enough above the ground to discharge into wheelbarrows.

All materials entering into the construction of the Rex mixer are steel or refined semi-steel, the only timber parts being the tongue and the charging platform. The drum is of cast semi-steel made in two sections bolted together in the middle. This drum is exceptionally hard and will outwear several drums that are made of plate steel, it is claimed, for the walls are several times thicker and have no rivets to work loose. The sprocket teeth are



NO. 10 REX MIXER, WHICH HAS LOW CHARGING FEATURE.

cast in sections which are bolted to the drum. If through some accident a tooth should be broken, it can be replaced in a few minutes at a very small cost. The mixing blades carry the material in a very rapid manner from the large charging opening toward the center of the drum, where it is carried upward by discharging buckets and drawn back again into the mixing blades. The mixing operation is threefold and insures a very rapid mix and an absolutely uniform quality of concrete in a few turns of the drum. The drum is supported on large chilled tracker rollers which are lubricated by means of compression grease cups.

The Rex mixer is driven by riveted chain belt. The frame is constructed of heavy steel channels and thoroughly braced. The road wheels on the Rex mixer are 28 inches in diameter, with a 6-inch face, to facilitate hauling over rough roads. The Rex mixer is guaranteed for a period of one year against inherent defects in workmanship and material by the Chain Belt Co., Milwaukee, Wis., its maker. For a mixer, with the meritorious features of the Rex, it is among the lowest priced on the market.

The annual publication, covering the proceedings of the eleventh annual convention held at Chicago, Dec. 14-18, 1914, has just been published by the American Road Builders' Association. In addition to the convention proceedings the book contains the reports of the secretary and treasurer and a list of members.

GYPSUM PRODUCTS

Shall the Lesson Be Lost Again?

Perhaps the most prominent material lesson that one encounters at the two great fairs at San Francisco and San Diego is the striking adaptability and effectiveness of gypsum and gypsum products for ornamentation purposes. It is a repetition of the same lesson first brought to general attention of builders at the World's Fair in Chicago, where the stucco and plaster work excelled anything that had been exhibited to the public gaze previous to that time.

In all the exhibitions of national or international importance since 1893 the same thing has been accentuated with ever increasing emphasis, but in none of the former achievements has there been such a wealth of stucco and plaster decoration and ornamentation as the present Panama Pacific fairs. The restful mission style of architecture, which is more distinctively American than any other, lends itself to effective decoration even better than the classic lines and renaissance refinements that were seen in the fairs at Chicago and St. Louis.

Our builders are slow indeed to profit by these repeated lessons so prominently taught at all of the great fairs. The principal adverse criticism of American structures is their lack of refined and artistic interior finish. We have become accustomed to a bordered niche without a statue; to an isolated moulding that calls for another member to make it complete; to a bare frieze that should be filled with bas-relief; to wide expanses of plane ceiling without even so much as a centerpiece to relieve the monotony and usually left in the cold white instead of employing color, form and combination to make it expressive.

Such an apparent lack of taste as the average American structure presents is out of keeping with every other expression and idea that describes American sentiment. We have good taste in our vehicles, in our railroad cars, for instance, in our dress, in our parks, and in almost every other connection. The single exception of very bad taste is in the completion of buildings of every description, whether it be a palatial office building, the stately residence of the merchant prince, or the comfortable home of the substantial citizen.

Plaster is the last process that every building undergoes just before it is brought to completion. The plasterers "finish the job," to use the common vernacular of contractors. Such a finishing process should be allowed to consume about as much time as the entire construction of the rough parts of the building, and so give the workmen and artists an opportunity to produce a finished piece of work at once worthy of their skill and of the splendid material which they have to work with.

But this is not the way that such work is done. A plentiful supply of sand is provided the day before the plasterers arrive, a figured number of tons of plaster are hauled to the job by wagons, the contractor is pushed by the owner to hurry the job to completion. The very part of the job that should take the greatest amount of time is hurried through in a few days. The first coat of "mud" is thrown upon the ceilings and walls as rapidly as possible and the material is selected solely with reference to the rapidity of its set. The second coat is done much in the same way, smoothed so as to make plain surfaces if the mechanic has time to do it, otherwise the skim coat of lime and gypsum follows immediately and all the darbying is done in one operation if that can possibly be accomplished. Often the carpenters are tacking on the trim before the plasterer's laborers can move out the scaffolding. If it is snow-white, smooth and even-surfaced it is passed as a good job. The quicker the cheaper, and the cheaper the better.

Once in a great while an owner gets extravagant and orders a simple cove with a plain moulding beneath and a little beading above in some of the most important rooms. He may go so far as to run a few mouldings in the parlors or reception hall to make panels of the bare expanses of wall surface between the openings or over the mantel, and sometimes he may even order a centerpiece in high relief of a more or less stock pattern. But this does not develop by any means the possibilities for elegance in decoration that can easily be secured without any great expense by the use of stucco in artistic expression of line and contour.

The lessons of the great fairs are studied by the architects who design all classes and types of buildings as the models which are made available by the achievement of the designer of these veritable banquets of designs. Yet, as the years go on, there is little or no improvement in the employment of a material that has more beauty, more individuality and more originality locked up in its possibilities than any other means at the command of the gifted and educated designer.

The cost of rich plaster ornamentation, if considered at the time the specifications are being figured by the various contractors, would amount to very little in addition to the estimated cost, for it is about as easy to figure it one way as another, simply meaning to the contractor the selection of the men he sends to the job. The material itself is so insignificantly cheap as not to cut any figure at all. It is easy enough for the workman and artist to produce one form or another with the readily plastic material at the option of the designer.

Most probably the deficiency is entirely with the designer, who leaves the plastering detail to be worked out while the balance of the job is progressing with the concrete workers, masons, carpenters and other crafts. The plastering he will decide later on. He never has time later on to give to the matter, and so substitutes a recommendation of plainness, and expatiates upon the beauty of simplicity because he is unprepared to supply the working details for the beautification of the finished job, and so after having spent all the money of the appropriation elsewhere, the plastering is done "in beautiful simplicity."

Great architects, or any man worthy of being considered as a designer of buildings, should complete their work, study the finishing embellishments and refinements that will make their work a credit to themselves and give the owner value received for his investment. This can be done in no other way than that of deciding the plastering details before the contracts are let to begin the work.

Since the finished plastered surfaces are always to be that part of the buildings which challenges the eye of the user of the building it is the most important part thereof, and should be considered with the first essentials. Very likely prospective owners, who give the order to proceed with the work as designed by the architect, would be more careful to ascertain whether the job was to be really finished or not were it not for the hurry, the unseemly speed with which all things of this kind are commonly considered in this country. There can be no noticeable improvement in this regard until owners are brought to a knowledge of the difficulties which beset the architects and superintendents of the buildings after the work has once got well started.

If owners would place the appearance and design of the interior as a first consideration, as it always should be, then the designers would be forced to decide the matters of ornamentation, decoration and proper finish as the principal factors to induce the owner to proceed with his investment upon the lines and suggestions that he has prepared.

New York Plaster Situation.

New York, Sept. 15.—The Building Trades Employers' Association has up for consideration at its next meeting the acceptance of the plasterers of the arbitration proposal whereby it is to be determined whether the steward system is to be countenanced in this city. In the meantime the men who had been locked out have returned to work, thus permitting building construction to proceed without interruption.

J. F. Krafft, of McNulty Brothers, perhaps the hardest hit by the lockout, said, when asked for a statement for Rock Products and Building Materials:

> This cannot be said to be a victory for anybody. It is a plain case of the calm consideration of the claims of the men. In the meantime they have gone back to work and the Building Trades Employers' Association has ordered its members to reinstate the men pending arbitration. Building construction was not seriously tied up as a result of the lock-out, but had it continued there is no telling what might have resulted. We look for a reasonable adjustment of the difficulty.

The steward system, in short, consists of the appointment of a union plasterer on every job where more than ten men are employed whose duty it shall be to see that no plasterer does more than a certain prescribed amount of work in eight hours, the wages of the steward being paid for by the boss, according to the statement of an employer. The union claims that the way the men are employed and worked by bosses rushing work through on an excess time penalty clause, forces a great many journeymen plasterers out of employment and that the only way the union plasterers can be kept employed is to maintain a minimum day's work.

The conditions under which building contracts are taken in New York call for a penalty of so much a day for every day over the specified time in which the contractor agrees to erect it. The result is that the bosses are alleged to have kept a secret list of rapid workmen who have been kept more or less permanently employed during dull times so that when jobs are taken between renting seasons the contractors will be equipped with trained men to rush the job through to completion on schedule time. The men say that this practice has led to the elimination of a large number of their men except in rush times and that it is this large proportion of intermittently employed plasterers who are insisting upon the introduction of the steward system.

CLAY PRODUCTS

Brick Makers Organize; Improve Art.

A series of events with most happy significance to the art of brickmaking has led to the organization of the Institute of Paving Brick Manufacturers. Its officers are F. R. Kanengeiser, president; D. E. Humphrey, vice president; Robert Keplinger, secretary, and Spencer M. Duty, treasurer.

A meeting was slated for Galesburg, Ill., on Sept. 22. The place was selected with a view to the opportunity it affords to visit the plant of the Purington Paving Brick Co. It has become the rule of the institute to combine plant inspection with theoretical study and its investigations at Galesburg were to be a continuance of those pursued at the plants of the Bessemer Limestone Co. in Youngstown and the Metropolitan Paving Brick Co. in Canton.

Like most organizations that fill a real need, the institute is less the result of a deliberate plan on the part of an organizer than the outgrowth of a spontaneous desire on the part of certain manufacturers for more intensive practical study into brick making problems. Certain conferences held at the time of the Detroit meeting resulted in the appointment of a meeting in Youngstown on May 25. Officers were elected there and a committee appointed to draw up a constitution and by-laws, which were adopted in a meeting at Canton on June 29.

"Whereas," recites the preamble, "there are now manufactured in the United States of America, from certain shales and clays, bricks and block especially made for use in building and constructing streets and roadways, and, as it is desirable that such brick and block be manufactured in a manner best suited and adapted for said purpose, therefore the subscribers hereto shall and do constitute a society to be known as the Institute of Paving Brick Manufacturers."

The object is further stated to include meetings, discussion and the reading of papers as a means of disseminating among the members further knowledge as to the manufacture of their product.

The organization of this institute is an evidence of the new day that has dawned in competitive industry, a day when competitors take mutual pride in the advance of their profession and realize that more is to be made by each through a reputation for good service accruing to all, than through jealousies and secrecy. The institute is advancing one of the cardinal objects of the National Paving Brick Manufacturers' Association and has its hearty approval and co-operation.

HAVERSTRAW BRICK STRIKE SETTLED.

New York, Sept. 18.—Following the settlement of the nine-weeks' Haverstraw brickmakers' strike last week about two-thirds of the plants in that district resumed operations short handed on Monday. Each yard operated about four machines. By the beginning of next week the plants will all be operating at about 75 per cent of capacity on the average. Only three plants remained closed. These are leased establishments which have a pretty fair reserve of brick on hand, sufficient, perhaps, to carry them over the winter.

According to present plans Haverstraw probably will continue to operate up to the actual setting in of frost. The strike helped the manufacturers to work off their over-supply and the manufacturers in that section will be about equally equipped with the upper Hudson plants in the matter of supply for the coming winter, before the season closes.

During the last fortnight the price of common brick in this market has improved considerably. Where $6.00 a thousand, wholesale, was high a month ago, it is about medium now, there being cases where good brick is going out at $6.25 a thousand. Despite a slump in demand on the fifteenth and sixteenth of this month New York prices held firm.

The fact that three boroughs out of five in New York reporting for August showed a gain of 36 per cent in building plan filings makes the brick makers feel that there will be an active winter in building construction, especially if September shows the same relative gain.

News of the Field.

At Junction City, Ohio, the clay industry is booming. Capitalists of that town have organized a new company with a capital of $75,000, which will manufacture paving block and kindred clay products. The incorporators are the following: L. H. Henry, B. L. Daugherty, William Bringardner, Joe M. Clark, W. E. Guinsler, William Klinger and A. E. Lidersdale.

The plant of the Entress Brick Co. at Bedford avenue and Chauncey street, Pittsburgh, was considerably damaged by an explosion on Sept. 13.

The Adamantine Clay Products Co., whose plant at North Mountain, W. Va., was lately burned, will rebuild.

The Glass Brick Co., which has offices in Cincinnati, has completed the concrete work on its plant at Huntington, W. Va., and proposes to begin operations there in December. It has a capital of $600,000, and proposes to build a plant of 50,000 daily initial capacity and with an ultimate capacity of 200,000 glass brick. Charles B. Lawton is president.

J. K. McGoodwin, a Princeton, Ky., brick manufacturer, received a warning signed "Possum Hunters," together with a bunch of thorn switches, threatening him for employing negro laborers. Mr. McGoodwin at once dismissed his negro force.

Edward Ferger, of the Glass Brick Co., of Huntington, W. Va., is contemplating the establishment of a branch of the Huntington plant at Chattanooga, Tenn. All of the materials for the manufacture of this kind of brick, including white sand, exist in abundance around Chattanooga.

A new exhibit has been installed by the Key-James Brick Co., of Chattanooga, in the exhibit department of the Manufacturers' Association Building.

The Cincinnati Clay Products Co., Cincinnati, Ohio, has benefited by new construction at the University of Cincinnati, securing an order for 160,000 brick to be used on the new chemistry building which is going up at the university. The particular variety sold on this job is a new one, both with the company and in Cincinnati, being secured, it is understood, from a plant south of there, and hence termed by the company the Southern brick. Another good job recently landed by this company was for 180,000 Darlington brick for a new public school in Warsaw, a suburban district. With such jobs as these for delivery and a normal run of smaller work, the company is running along very nicely.

Louisville Brick Notes.

Louisville, Ky., Sept. 18.—George Fiedler, general manager of the Coral Ridge Clay Products Co., reports that the concern is enjoying a steady business, and is at present contracting for some large orders, which have not as yet been made public. Mr. Fiedler states that face brick, a recent addition to the company's line, is selling very encouragingly. The firm recently furnished all common and hollow brick used in the new Louisville boys' high school, in the J. B. McFerran School, in the Emmet Field School, and in the Flat Lick School. The Coral Ridge Clay Products Co. has engaged permanently a booth at the Louisville Manufacturers' Exhibit, in the Arcadia building, and here exhibits sample products of its factory. The firm was also well represented in the industrial parade which preceded the opening of the exhibit. There recently appeared in the Louisville Herald an interesting article of condensed facts about the Coral Ridge Clay Products Co. It stated that the firm was incorporated in 1913 with a capital stock of $100,000 by W. D. Roy, who is at present a director. The officers of the concern are O. B. Bergstrom, president; C. T. Priest, vice-president; and George H. Fiedler, general manager. The plant of the company is located at Coral Ridge, Ky., and at this place every ingredient for the clay products is obtained. From 40 to 50 workmen are employed. The distribution of the products is limited to Kentucky and Southern Indiana. The present output is 60,000 brick per day, but it is the intention of the company to increase this amount in the near future. Brick of every description are manufactured, but principally the "Coralmatt" and "Coralruff" brands, which will be used in the new Speed building to be erected on Fourth street.

The Southern Brick and Tile Co. and the Hillenbrand Brick Co. furnished face brick used in the new Louisville boys' high school, which was opened for public inspection Sept. 6.

Articles of incorporation for the Paducah Clay Co. were recently filed at Paducah, Ky., the incorporation figures being placed at $4,000. The officers of the company are: H. R. Lindsey, president; Luther F. Carson, vice-president; and L. F. Burradell, secretary and treasurer. The clay deposits which the company own and will mine are in Marshall county, about four miles from Benton. The clay is of fine quality and is already in demand at many of the large potteries in the East. The supply is also said to be practically inexhaustible. The company is at present considering the construction of a four and one-half mile spur, from the Nashville, Chattanooga and St. Louis Railroad in order that the shipment of the clay might be facilitated.

PITTSBURGH BRICK FIRMS BUSY.

Pittsburgh, Sept. 18.—Brick concerns are fairly busy, but have plenty of stock on hand. Retailers have not been able to move out their stocks very rapidly and as a result there is a surplus at many plants. Prices are pretty low and competition is hard. In this line the paving brick men are faring a little better than building brick dealers and manufacturers.

The new factory of the Baker Clay Co., Grand Ledge, Mich., is now at work turning out both brick and tile of excellent quality. The factory started in with about 50 men on its pay roll.

Modern Solution of the Hauling Problem.

(Continued from page 41.)

four-ton model as shown in accompanying illustrations. These photographs show the Packard with a full load of crushed stone as it travels between loading and unloading points and the operation of the dump body at the scene of road-building operation. Through the use of a controlled tail gate, the stone can be spread at any desired thickness on the roadway, eliminating a large part of the hand labor heretofore made necessary in distributing the stone.

Edington & Paters of Knoxville, Tenn., have destroyed one of the most sacred illusions concerning the Tennessee mule, through the use of the Packard motor truck. These road builders undertook to construct a water-bound macadam type of crushed stone through the Great Smoky mountain foot hills. Until recently the grades of these foot hills were regarded as passable only to the sure-footed mule. One day a Packard truck rolled into view and in one week put an everlasting crimp into what had always been a fortnight job, to say nothing of organizing itself into a litle recreation league for hauling coal from a siding 12 miles away. It was a six-ton dump truck, with hydraulic hoists and a spreader tail gate. The contractors first graded the right of way and then rolled it down. Marker strips were placed along each side, supported by stakes and a shoulder of earth. The Packard truck dumped the stone into the channel thus formed, where it was wet down and rolled until bound into a solid pike ten feet wide. This pike was reinforced by earthed margins formed by the rollers action on the loose earth outside the strips. In spreading the stone, the first layer was a coarse rubble spread while the truck was in motion. The tail gate was regulated to lay it 4 inches thick and 10 feet wide. The same operation was repeated with No. 2 stone. The latter was laid about the same width and thickness, but mixed with screenings. Before the advent of the truck the owners were skeptical about the advantages of machinery over mule power. Working day after day on seven-mile sections, the truck, however, dispelled every doubt. The only mules left on the job were the two that pulled the sprinkler.

The Adams Brothers Contracting Co. of Zanesville, Ohio, also had an interesting experience in installing a Packard truck. Their purchase was a six-ton dump truck, the body designed for hauling brick, cement, sand and all kinds of road materials. They said they were transporting brick eight miles over country roads and that the truck was making three sixteen-mile trips every ten hours; carried 1,400 brick on each trip, and since it was working double shift, delivering 8,400 bricks every day. W. H. Adams, president of the company stated that the same work done with a horse and wagon outfit would have cost five dollars a day for hire and the team would be able to deliver only 400 bricks per day. In other words, the truck on this job was just about two thousand per cent better than a horse outfit.

Charles C. Quinn, road superintendent of Harris county, Texas, has an outfit consisting of a three-and-one-half-ton Kelly Springfield motor truck and two three-and-one-half-ton Troy trailers, and makes the following interesting report:

Before putting on these outfits our teams made three trips per day, hauling 1½ yds. or a total of four and one-half (4½) yards at a cost of $4.00 per day or 35½ cts. per yard mile. The truck and trailer easily doubles the output of the truck and we see no difference in the cost of fuel—it never takes over 15 gal. and sometimes 10 will run us the whole day—lubricating oil and greases cost about 35 cts per day. There is also a saving made in the spreading of the material; I can set the Trailer to spread any thickness required and it never takes more than five minutes for one man to complete the spreading of a 3½ yd. load.

We often put two trailers behind one truck and they go the same as if there was one on high speed from the car to the dump.

Our methods of loading are not what should be used to get the best results; we use hand labor and the time required to load the truck and trailer is usually 20 minutes. The haul is 2½ miles and we make six trips in an eight hour day. This includes the two hours lost in the loading and with the right methods for unloading from the car into the trucks and trailers, at least two more trips could be made.

The KisselKar Truck in California.

In former days all the celite taken from the Kieselguhr quarries at Lompoc, Cal., was hauled to the drying yards by mule teams, and eventually the finished product, silocel, as well. Motor trucks were not used because the digging away of the mountain itself makes permanent roads impractical. A two and one-half-ton KisselKar truck was put into service, however, and has proved itself capable of taking every grade and every condition of loose roadbed without pause, moving far more rapidly than mule teams and carrying many times as much.

The tremendous economy introduced by the properly constructed trailer to tractor or motor truck equipment can be well understood with the explanation that every load ton of the motor develops a pulling force that will draw three tons more in a trailer without additional fuel or expense of any kind except that incident to oiling and upkeep of the trailer vehicle itself.

We hope next month to have some more facts and figures to spread the gospel of economy and efficiency where it is most needed at the present time in connection with the actual operations of the present season.

Large additions will be made to the plant of the Thames Quarry Co., St. Mary's, Ont. A new crusher building, 30x60 feet, will be built and new machinery installed.

The market place of the building material industry. Employment department, machinery wanted and for sale, etc. If your wants are not answered in this page, write a letter to this office.

THE FRANCIS PUBLISHING CO.
537 S. Dearborn Street Chicago, Illinois

:: THE :: BOURSE

Advertisements will be inserted in this section at the following rates:
For one insertion.....35 cents a line
For two insertions.....45 cents a line
For three insertions.....60 cents a line
Eight words of ordinary length make one line.
Heading counts as two lines.
No display except the headings can be admitted.
Remittances should accompany the order. No extra charges for copy of paper containing the advertisement.

MACHINERY FOR SALE

MACHINERY FOR SALE ON ACCOUNT OF CHANGING TO ELECTRICITY.

1 Reliance Corliss Engine, 175 H.P., 14x36, 120 R.P.M. Double ported valves, flywheel 10 ft x 21 inch face. All in excellent condition. One 10x16x10x10 type C.C.S. Bury Air Compressor, with speed and pressure governor Cap. 390 c.f. Three Erie City flue boilers, 125 H.P. each, in fair condition. Same can be seen at our works at Gibsonburg, Ohio. For information, prices and other facts, apply to NATIONAL MORTAR & SUPPLY COMPANY, Pittsburgh, Pa.

FOR SALE—Best empty cement bag baler, smallest price. Also brick and block machines. Address W. BARTEN, Gordon, Nebr.

STONE CRUSHER FOR SALE.

ONE NO. 4 CLIMAX Stone Crusher in good condition to be sold at a great sacrifice. Contractor retiring from business. Address P. O. Box 27, Rochester, N. Y.

CABLE EXCAVATOR

FOR SALE—Second-hand Shearer & Mayer dragline cableway excavator; complete with cables for 500-foot span. One double drum 10x10 Lidgerwood engine and boiler; 1½ cubic yard excavator type bucket, carrier and blocks in good condition. Can make immediate delivery. Address BOX *1070*, ROCK PRODUCTS AND BUILDING MATERIALS.

FOR SALE—One 60 h.p. Boiler and one 20 h.p. Engine. Boiler is on skids and engine is stationary. Address Box 1073, ROCK PRODUCTS AND BUILDING MATERIALS.

MACHINERY WANTED

WANTED—One 10 h.p. Motor and Starter complete. Address Box 1072, care ROCK PRODUCTS AND BUILDING MATERIALS.

PLANTS FOR SALE

FOR SALE.

Cement Mill and 110 Acres of land, formerly of Vindex Portland Cement Company and of Reading Cement Company, near Evansville on branch of P. & R. R. R. Company. Capacity 600 bbls. per day. Suitable for producing lime fertilizer or crushing and pulverizing rock products. Large cement rock deposits, developed quarry, lime stone plentiful in neighborhood. For information or examination of premises, apply to CHAS. T. NAGLE, Sec'y. BONDHOLDERS' PROTECTIVE COMMITTEE. 916 Centre Ave., Reading, Pa.

FOR SALE—GREAT "WHITE CLIFFS" CEMENT BED In Arkansas. Enough to supply world for century, including 2,092 acres land. Transportation facilities, river and three railroads; land alone worth price asked for all. Sinking wells near it for "Oil and Gas." Fine prospects for both. For full particulars write J. B. DRURY, 406 Market St., St. Louis, Mo.

FOR SALE—An up-to-date Sandlime Brick plant. Running right along and in good condition. A bargain for some one. Address P. O. Box 246, Colton, Calif.

FOR SALE OR TRADE—Up-to-date hollow brick and tile plant. Products sold before made. The J. R. FORD REALTY CO., 931 The Spitzer, Toledo, Ohio.

CLASSIFIED BUSINESS DIRECTORY

BAGS AND BAG TYERS.
Faeberhill Mfg. Co. (bag tyers).
Jalte Company, The.
Urschel Bates Valve Bag Co.

BELTING.
H. W. Caldwell & Co.
Chain Belt Co.
Dull & Co., R. W.
Goodrich Co., B. F.
Imperial Belting Co.
Link Belt Co.
Revere Rubber Co.
Stephens-Adamson Mfg. Co.
Webster Mfg. Company.
Weller Mfg. Co.

BRICK.
Belden Brick Co.
Metropolitan Paving Brick Co.

BRICK CLAMPS.
The P. D. Crane Co.

BRICK PAVING.
Metropolitan Paving Brick Co.

BUCKETS, DUMPING AND GRAB.
Atlas Car & Mfg. Co.
H. W. Caldwell & Co.
Haiss Mfg. Co., Inc., Geo.
Hendrick Mfg. Co.
Lakewood Engineering Co.
Link Belt Co.
McMyler-Interstate Co.

CABLES.
American Steel & Wire Co.
Dull & Co., R. W.
Sauerman Bros.

CALCINING MACHINERY.
Atlas Car & Mfg. Co.

CARS, INDUSTRIAL.
Atlas Car & Mfg. Co.
Austin Mfg. Co.
Haiss Mfg. Co., Inc., Geo.
Lakewood Engineering Co.
Link Belt Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

CASTINGS.
Allis-Chalmers Mfg. Co.
Traylor Eng. & Mfg. Co.

CEMENT, CAEN STONE.
Cleveland Bldrs.' Supply Co.

CEMENT, HYDRAULIC.
Carolina Portland Cement Co.

CEMENT, PORTLAND.
Atlas Portland Cement Co.
Carolina Portland Cement Co.
Chicago Portland Cement Co.
Clinchfield Portland Cement Corp.
Copley Cement Mfg. Co.
Crescent Portland Cement Co.
Huron-Wyandotte Port. Cement Co.
Kansas City Portland Cement Co.
Lehigh Portland Cement Co.
Marquette Cement Mfg. Co.
Northwestern States Portland Cement Co.
Ohio & Western Lime Co.
Phoenix Portland Cement Co.
Sandusky Portland Cement Co.
St. Louis Portland Cement Works.
Union Sand & Material Co.
Whitehall Portland Cement Mfg. Co.
Wolverine Portland Cement Co.

CHAINS.
Chain Belt Co.
Jeffrey Mfg. Co.
Link Belt Co.

CLAYWORKING MCHY.
American Clay Mchy. Co.
Bartlett, C. O., & Snow Co.

COAL CHUTES.
Interstate Mfg. Co
Kewanee Mfg. Co.

COLORINGS DRY AND MORTAR.
Samuel Cabot.
Calvert Mortar Color Wks.
Chattanooga Paint Co.
Clinton Metallic Paint Co.
Ricketson Mineral Paint Works.
Williams, C. K., & Co.

COMPRESSORS.
Allis-Chalmers Mfg. Co.
Clayton Air Compressor Co.

CONCRETE MIXERS.
Chain Belt Co.
Jaeger Mach. Co.
Lakewood Engineering Co.
Miscampbell, H.
Power & Mining Mach. Co.

CONCRETE REINFORCEMENT.
American Steel & Wire Co.

CONSULTING GEOLOGISTS.
Hunt, Robt. W., & Co.

CORNER BEADS.
North Western Expanded Metal Co.
Sykes Metal Lath & Roofing Co.

CRANES—LOCOMOTIVE AND GANTRY.
Cleveland Ry. Supply Co.
Link Belt Co.
McMyler-Interstate Co.

CONVEYORS AND ELEVATORS.
Allis-Chalmers Manufacturing Co.
Atlas Car & Mfg. Co.
Austin Mfg. Co.
Bartlett, C. O., & Snow Co.
Caldwell, H. W., & Sons Co.
Chain Belt Co.
Dull, Raymond W., & Co.
Ehrsam, J. B., & Sons Mfg. Co.
Haiss Mfg. Co., Inc., Geo.
Jeffrey Manufacturing Co.
Link Belt Co.
McMyler-Interstate Co.
McLanahan Stone Machine Co.
Manierre Eng. & Mach. Co.
Power & Mining Mach. Co.
Stephens-Adamson Mfg. Co.
Toepfer, W., & Sons.
Webster Mfg. Company.
Weller Mfg. Co.

CRUSHERS AND PULVERIZERS.
Allis-Chalmers Manufacturing Co.
American Pulveriser Co.
Austin Mfg. Co.
Bacon, Earl C.
Bartlett, C. O., & Snow Co.
Bonnot Co., The.
Bradley Pulverizer Co.
Butterworth & Lowe.
Chalmers & Williams.
Ehrsam, J. B., & Sons Mfg. Co.
Jeffrey Manufacturing Co.
K.-B. Pulverizer Co.
Kent Mill Co.
Lewistown Foundry & Machine Co.
McLanahan Stone Machine Co.
Pennsylvania Crusher Co.
Power & Mining Mach. Co.
Raymond Impact Pulverizer Co.
Sturtevant Mill Co.
Traylor Eng. & Mfg. Co.
Webb City & Carterville F. & M. Wks.
Williams Pat. Crusher & Pulverizer Co.

DRAIN TILE.
American Clay Co.
Vigo-American Clay Co.

DREDGES
Osgood Co., The.

DRILLS.
Loomis Machine Co.

DRYERS.
American Process Co.
Bartlett, C. O., & Snow Co.
Link Belt Co.
Ruggles-Coles Eng. Co.

ENGINEERS.
American Process Co.
Bacon, Earl C.
Dull, Raymond W., & Co.
Fuller Engineering Co.
Hunt, Robt. W., & Co.
Improved Equipment Co.
Meade, R. K.
Sauerman Bros.
Schaffer Eng. & Equip. Co.
Smidth & Co., F. L.
Stephens-Adamson Mfg. Co.
Traylor Eng. & Mfg. Co.
Yates, P. K.

ENGINES.
Allis-Chalmers Mfg. Co.
Power & Mining Mach. Co.

EXCAVATORS.
Raymond W. Dull Co.
Haiss Mfg. Co., Inc., Geo.
Indianapolis Cable Excavator Co.
Link Belt Co.
McMyler-Interstate Co.
Osgood Co., The.
Sauerman Bros.
Weller Mfg. Co.

FIRE BRICK.
Carolina Portland Cement Co.
Improved Equipment Co.
Thornton Fire Brick Co.

FLOOR HARDENER.
Ceresit Waterproofing Co.

FURNACES FOR SPECIAL PURPOSES.
Improved Equipment Co.

GAS PRODUCERS.
Improved Equipment Co.

GATES.
Haiss Mfg. Co., Inc., Geo.

GEARS.
Caldwell, H. W., & Son Co.
Chain Belt Co.
Link Belt Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

GLASS SAND MACHINERY.
Lewiston Fdy. & Mach. Co.

GYPSUM BLOCK.
American Cement Plaster Co.
U. S. Gypsum Co.
Plymouth Gypsum Co.

GYPSUM—PLASTER.
American Cement Plaster Co.
Best Bros. Keene's Cement Co.
Cardiff Gypsum Co.
Carolina Portland Cement Co.
National Mortar & Supply Co.
Ohio & Western Lime Co.
Plymouth Gypsum Co.
U. S. Gypsum Co.
Wheeling Wall Plaster Co.

HAIR.
Ohio & Western Lime Co.

HOISTS, ELECTRIC AND STEAM.
Allis-Chalmers Mfg. Co.
Link Belt Co.
Haiss Mfg. Co., Inc., Geo.

HOLLOW CLAY TILE.
American Clay Co.
Metropolitan Paving Brick Co.
Vigo-American Clay Co.

HYDRATING MCHY.
Atlas Car & Mfg. Co.
Kritzer Co., The.
Miscampbell, H.

LIME.
Carolina P. C. Co.
Kelley Island Lime & Trans. Co.
Mitchell Lime Co.
National Lime & Stone Co.
National Mortar & Supply Co.
Ohio & Western Lime Co., The.
Owens & Son, John D.
Scioto Lime & Stone Co.

LIME, HYDRATED.
Kelley Island Lime & Transport Co.
Mitchell Lime Co.
National Lime & Stone Co.
National Mortar & Supply Co.
Ohio & Western Lime Co., The.
Scioto Lime & Stone Co.

LIME KILNS.
Atlas Car & Mfg. Co.
Improved Equipment Co.

LOADERS AND UNLOADERS.
Ambursen Company.
Chain Belt Co.
Haiss Mfg. Co., Inc., Geo.
Jeffrey Mfg. Co.
Link Belt Co.
Manierre Eng. & Mach. Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

LOCOMOTIVES.
Davenport Locomotive Wks.

MANGANESE STEEL.
Allis-Chalmers Mfg. Co.
Link Belt Co.

METAL LATH.
Bostwick Steel Lath Co.
Carolina Portland Cement Co.
North Western Expanded Metal Co.
Sykes Metal Lath & Roofing Co.
Trussed Concrete Steel Co.

MOTOR TRUCKS.
Kissel Motor Car Co.
Pierce-Arrow Motor Car Co.

PAINT AND COATINGS.
Cabot, Samuel.
Calvert Mortar Color Wks.
Ceresit Waterproofing Co.
Chattanooga Paint Co.
Gordon-Hittl Co.
Ricketson Mineral Paint Co.
Williams, C. K., & Co.

PERFORATED METALS.
Allis-Chalmers Mfg. Co.
Johnson & Chapman.
Hendrick Mfg. Co.
Toepfer, W., & Son.

PLASTER.
See Gypsum.

PLASTER BOARD.
American Cement Plaster Co.
Plymouth Gypsum Co.
U. S. Gypsum Co.

PLASTER BOND.
Ceresit Waterproofing Co.

PLASTER MCHY.
Butterworth & Lowe.
Dunning, W. D.
Ehrsam, J. B., & Sons Mfg. Co.
Miscampbell, H.
Williams Pat. Crusher & Pulverizer Co.

PREPARED ROOFING—SHINGLES.
Carolina Portland Cement Co.
Reynolds Asphalt Shingle Co.

PUMPS.
Allis-Chalmers Mfg. Co.
International Steam Pump Co.

QUARRY CARS.
See Cars.

ROAD MACHINERY.
Austin Mfg. Co.
Osgood Co., The.
Troy Wagon Works.

ROOFING-METAL.
Sykes Metal Lath & Roofing Co.

SAND.
Union Sand & Material Co.

SAND AND GRAVEL WASHING PLANTS.
Dull & Co., Raymond W.
Link Belt Co.
Stephens-Adamson Mfg. Co.
Webster Mfg. Co.
Weller Mfg. Co.

SAND LIME BRICK MACHINERY.
Amer. Clay Machy. Co.

SCALE CARS.
Atlas Car & Mfg. Co.

SCREENS.
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Butterworth & Lowe.
Chain Belt Co.
Dull & Co., Raymond W.
Ehrsam, J. B., & Sons Mfg. Co.
Haiss Mfg. Co., Inc., Geo.
Hendricks Mfg. Co.
Johnston & Chapman Co.
Link Belt Co.
McLanahan Stone Machine Co.
Power & Mining Mach. Co.
Stephens-Adamson Mfg. Co.
Sturtevant Mill Co.
Toepfer, W., & Sons.
Webster Mfg. Company.
Weller Mfg. Co.

SECOND-HAND MACHINERY.
Bourse.

SEWER PIPE.
Houston Bros. Co.
Plymouth Clay Products Co.

SHEAVES, BLOCKS AND VALVES.
Haiss Mfg. Co., Inc., Geo.

SINK AND FLOAT TESTERS.
Pennsylvania Crusher Co.

SPREADERS, ROAD.
Troy Wagon Wks. Co., The.

STEAM SHOVELS.
Marion-Osgood Co.
Thew Automatic Shovel Co.

STUCCO RETARDER.
National Retarder Co.

TRAILERS, TRACTORS AND MOTOR TRUCKS.
Troy Wagon Wks. Co., The.

TRAMWAYS.
Ambursen Company.
American Steel & Wire Co.
Link Belt Co.

TUBE MILLS.
Allis-Chalmers Manufacturing Co.
Power & Mining Mach. Co.
Smidth & Co., F. L.

WAGONS—DUMP AND REVERSIBLE.
Troy Wagon Wks. Co., The.

WALL PLUGS AND TIES.
Sykes Metal Lath & Roofing Co.

WATERPROOFING.
Cabot, Samuel, Inc.
Carolina Portland Cement Co.
Ceresit Waterproofing Co.
General Fireproofing Co., The.
Sandusky Portland Cement Co.

WEIGHING MACHINES.
Schaffer Eng. & Equip. Co.
Sturtevant Mill Co.

WIRE AND WIRE FENCING.
American Steel & Wire Co.

WIRE ROPE.
American Steel & Wire Co.
Leschen, A., & Sons Co.

ROCK PRODUCTS and BUILDING MATERIALS

Index to Advertisements

SEPTEMBER 22, 1915

SEI